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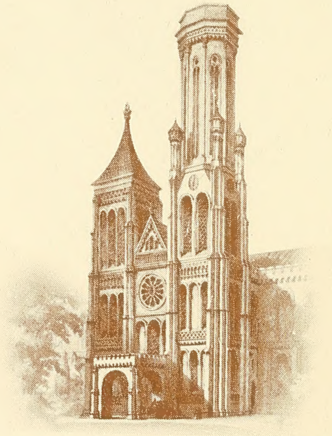

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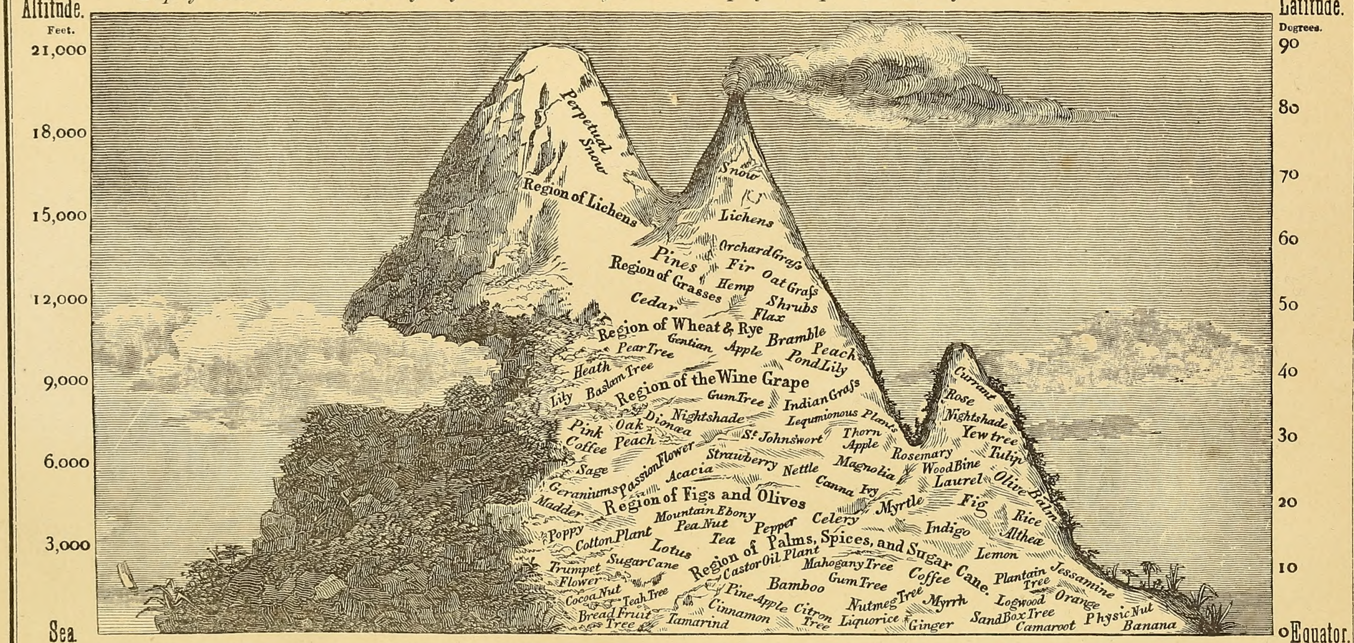
Top of Chimborazo, 21,000 *feet from the level of the sea—top of Cotopaxi,* 18,876 *feet.*



Progress of vegetation at different Elevations, corresponding with its progress in different Latitudes.

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FAMILIAR

LECTURES ON BOTANY,

EXPLAINING THE

STRUCTURE, CLASSIFICATION, AND USES

OF

PLANTS,

ILLUSTRATED UPON THE LINNÆAN AND NATURAL METHODS,

WITH

A FLORA FOR PRACTICAL BOTANISTS.

FOR THE USE OF COLLEGES, SCHOOLS, AND PRIVATE STUDENTS.

BY MRS. ALMIRA H. LINCOLN,
(Now MRS. LINCOLN PHELPS,)
LATE PRINCIPAL OF THE PATAPSCO INSTITUTE OF MARYLAND; AUTHOR OF "THE FIRESIDE FRIEND
A SERIES OF WORKS ON BOTANY, CHEMISTRY, NATURAL PHILOSOPHY, AND GEOLOGY.
"IDA NORMAN," "HOURS WITH MY PUPILS," ETC.

NEW EDITION, REVISED AND ENLARGED
ILLUSTRATED BY MANY ADDITIONAL ENGRAVINGS.

WITH A SUPPLEMENT
CONTAINING
A FAMILIAR INTRODUCTION TO THE NATURAL ORDERS,
AND
AN ARTIFICIAL KEY FOR ANALYSIS OF THE SAME.

THREE HUNDRED AND SEVENTY-FIFTH THOUSAND

PHILADELPHIA:
J. B. LIPPINCOTT COMPANY.

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PREFACE.

SINCE the publication of this work, in 1829, it has been often revised, and new genera and species of *Southern* and *Western* plants, as well as those of more *Northern latitudes*, have been added. The Flora embraces descriptions of the indigenous plants of the United States which the pupil will be likely to meet with, especially of the Phenogamia, as well as a great proportion of cultivated exotics.

Researches in Physiological Botany have, of late, been diligently pursued, and the valuable discoveries recently made in this department are incorporated into the present edition.

The NATURAL SYSTEM OF BOTANY will be found here fully exhibited in all its essential features according to the method of Lindley, and with full descriptions of NATURAL ORDERS.

Professor Lindley, in the preface to his late valuable work on the "Vegetable Kingdom," remarks, that in England little had been known until recently of the labors and discoveries of the scientific men *out of that country*, and claims for himself little more than the honor of bringing these discoveries to the notice of his countrymen.

The Author of this work, in its preparation more than twenty years since, availed herself of the most valuable foreign works consulting English books less than those of the French and German school of Botany, so that in reality much that Lindley brings forward as of "foreign origin," had previously found a place in this work; as the doctrine of the *metamorphosis of vegetable organs*, *the tissues of plants in structural botany*, and many of the phenomena of vegetable physiology.

Attempts to break up the old landmarks of the science of Botany, and to present it under an entirely new form, tend to repel from its pursuit many of its devoted friends, and to discourage beginners, by offering at the commencement nothing which the mind can regard with pleasure.

"No one," says Lindley, "who has had experience in the progress of Botany as a science, can doubt that it has been more impeded by the *repulsive appearance* of *the names* it employs, than by any other cause whatever; and that in fact *this circumstance has proved* an *invincible obstacle* to its becoming the serious occupation of those who are unacquainted with the learned languages."

Regarding the Linnæan system as the key to botanical science, the Author has in the beginning sought to instruct the student in its use; while in the temple to which it gives access, will be found exhibited in distinct lineaments the *panorama of the natural system.*

This work professes to be of itself a *botanical* library, sufficiently full in each department for all purposes of a class-book, or for the private student. Such was the object proposed in its first publication—as such it has been extensively and generally used throughout the United States.

The following extracts from a letter of the Hon. Wm. Darlington, M.D., to the Author, show the opinion of one of the first botanists of the age as to the respective merits of the Linnæan system and the *Natural Method:*—

"I entirely concur with you in considering the *Linnæan method* as the easiest and most agreeable guide to the *first steps* of the learner, and would always so employ it. But as it only introduces one to what may be called a *speaking acquaintance* with plants,—merely enabling the student to *call them by name* when he meets with them, without teaching any thing of their real *character*, or presenting any inducement to inquire after their relations,—I incline to think that all those who wish to make any substantial progress in the knowledge of the vegetable creation, should pay an early attention to those essential features and characteristics which enable the attentive observer to group kindred plants into *natural families.* There is a gratification in tracing the *affinities* between kindred individuals, quite equal to the pleasure of detecting the *discrepancies* which serve to distinguish them; and it is the intelligent contemplation of *both* these aspects of the floral kingdom which constitutes the delight of the *true Botanist.*

"From these remarks, you will perceive that my own opinion, gradually maturing under the observations and reflections of nearly half a century, is in favor of employing the *Linnæan* method for initiating young *beginners*, and awakening a taste for the study of plants; but that the *natural* arrangement should be held up as the only one compatible with a thorough understanding and truly scientific view of the vegetable kingdom. Such was the doctrine of the immortal Swede himself; and such I understand to be your own opinion of the *intrinsic merits* of the two systems.

"I think your work well calculated to attract beginners, and especially young ladies, to the study, by conducting them in the most agreeable way to the vestibule of the botanical temple, and that is all that any *class-book* professes to do, or can do."

TO TEACHERS.

The author indulges the hope that this book will not only afford assistance, but gratification, to Teachers in the pursuance of the severe and often *ennuyant* duties of their profession;—that it may serve to interest and quicken the dull intellects of some pupils, to arrest the fugitive attention of others, and to relax the minds of the over-studious, by leading them all into paths *strewed with flowers,* and teaching them that these beautiful creations of Almighty Power are designed, not merely to delight by their fragrance, color, and form, but to illustrate the most logical divisions of Science, the deepest principles of Physiology, and the benevolence of God.

The best time for commencing botanical studies seems to be that of the opening of flowers in the spring; though, where circumstances render it convenient to begin in winter, assistance is offered by engravings. The arrangement of subjects might be altered, in pursuing the study *without the aid of natural flowers.* The *Second* part, which treats of the various organs of plants, the formation of buds, and other subjects connected with vegetable physiology; the *Fourth* part, which gives the history of the science, with the distinctions in the kingdoms of nature, might be studied to advantage, before attending much to the principles of classification, which are mostly illustrated in the First and Third parts.

On the first meeting of a botanical class, after some explanation as to the nature of the study they are about to commence, each member should be presented with a flower for analysis. The flower selected should be a simple one, exhibiting in a conspicuous manner the different organs of fructification: the lily and tulip are both very proper for this purpose. The names of the different parts of the flower should then be explained, and each pupil directed to dissect and examine the flower. After noticing the parts of fructification, the pupils will be prepared to understand the principles on which the artificial classes are founded, and to trace the plant to its proper class, order, &c. At each step, they should be required to examine their flowers, and to answer simultaneously the questions proposed; as, How many stamens has your flower? Suppose it to be a lily, they answer *six.* They are then told it is of the sixth class. How many pistils? They answer *one*—they are told it is of the first order. They should then be directed to take their books and turn to the sixth class, first order, to find the genus. In each step in the comparison they should be questioned as above described, until.

having seen in what respects their plant agrees with each general division, and differs from each genus under the section in which it is found, they ascertain its generic name. They should be taught in the same manner to trace out its species: they will perceive at each step some new circumstance of resemblance or difference, until they come to a species, the description of which answers to the plant under consideration.

Technical terms should be explained as the pupil proceeds. The advantage in this kind of explanation, over that of any abstract idea, is, that it is manifested to the senses of the pupils by the object before them. If a teacher attempt to define the words *reason, will*, &c., or any other abstract terms, there is danger that the pupil may, from misunderstanding the language used in the explanation, obtain but a very confused and imperfect idea of the definition;—and, indeed, what two philosophical writers give to abstract terms the same definition? Though mankind do not, in the purely mental operations, exhibit an entire uniformity, yet, in their external senses, they seldom disagree. A flower which appears to one person to be composed of six petals, with corolla bell-form, and of a yellow color, is seen to be so by another. Pupils who find it difficult to understand their other studies (which in early youth are often too abstract), are usually delighted with this method of analyzing plants; they feel that they understand the whole process by which they have brought out the result, and perhaps, for the first time, enjoy the pleasure of clear ideas upon a scientific subject.

It is necessary, before the meeting of the class, to have a suitable number of plants collected, so that all may have specimens. In examining pupils as they proceed in their study, each one, besides reciting a lesson, should be required to give an analysis of one or more plants; sometimes the whole class having similar flowers; at others, permission being granted to pupils to bring any plant they choose. At public examinations, the extemporaneous analysis of plants is a satisfactory method of testing a knowledge of the subject. With respect to those portions of the work to which attention should most particularly be paid, much must be left to the judgment of the teacher. Whatever relates to modes of classification, and makes part of a system, should be noted: many remarks, illustrations, and quotations, designed for reading, are given in small type.

The analysis at the bottom of each page is designed rather to suggest the leading subjects, than as a form of questions; for every experienced teacher must perceive the importance of varying his mode of questioning.

As soon as he is somewhat advanced in the knowledge of plants, the pupil should be induced to form in his mind associations according to the *Natural Alliances;* and in herbaria it is better to arrange the plants by Natural Orders.

CONTENTS.

PAGE
Preface 3
Directions to Teachers 5
Rules for Pronouncing Botanical Names 298

LECTURE I.—Importance of System.—Advantages to be derived from the Study of Botany.—Division of the Lectures 9

PART I.

LECTURE II.—General Division of Sciences.—Departments of Botanical Science.—Parts of a Flower.—Analysis of Plants 13
LECTURE III.—Method of analyzing Plants.—Analysis of the Pink, Lily, Rose, and Poppy 15
LECTURE IV.—Classes and Orders of Linnæus 19
LECTURE V.—Method of analyzing Plants by a Series of Comparisons.—General Remarks upon Plants, &c 23

PART II.

LECTURE VI.—Importance of observing external Objects.—Vegetables consist of two Sets of Organs.—Of the Root 27
LECTURE VII.—Stem 34
LECTURE VIII.—Buds 39
LECTURE IX.—Leaves 42
LECTURE X.—Anatomy and Physiology of Leaves.—Their Use in the Vegetable System.—Fall of the Leaf.—Appendages to Plants 52
LECTURE XI.—Calyx 59
LECTURE XII.—Corolla 63
LECTURE XIII.—Stamens and Pistils 68
LECTURE XIV.—Inflorescence 76
LECTURE XV.—The Fruit.—Pericarp.—Parts of the Pericarp.—Mirbel's Classification of Fruits 81
LECTURE XVI.—The Seed.—Synopsis of the External Organs of Plants 89
LECTURE XVII.—Theory of Metamorphosis of Organs of Plants 94
LECTURE XVIII.—Physiological Views.—Germination of the Seed 98
LECTURE XIX.—Physiological Views.—Elementary Organs or Vegetable Tissues.—Solid and Fluid Parts of Vegetables 101
LECTURE XX.—Physiological Views.—Bark.—Wood.—Pith.—Growth of a Dicotyledonous Plant.—Growth of a Monocotyledonous Plant 107
LECTURE XXI.—Physiological Views.—Chemical Composition of Plants.—Proximate Principles.—Chemical Analysis of the Sap 114

PART III.—CLASSIFICATION.

LECTURE XXII.—Method of Tournefort.—System of Linnæus.—Natural Methods.—Method of Jussieu.—Comparison between the Classifications of Tournefort, Linnæus, and Jussieu 118
LECTURE XXIII.—Characters used in Classification 123
LECTURE XXIV.—Use of Botanical Names.—Artificial Classes and Orders considered in Groups.—Classes Monandria and Diandria 127
LECTURE XXV.—Triandria.—Tetrandria 132
LECTURE XXVI.—Pentandria 139
LECTURE XXVII.—Hexandria.—Heptandria 147
LECTURE XXVIII.—Octandria.—Enneandria 152
LECTURE XXIX.—Decandria 156
LECTURE XXX.—Icosandria.—Polyandria 159
LECTURE XXXI.—Didynamia.—Tetradynamia 165
LECTURE XXXII.—Monadelphia 168
LECTURE XXXIII.—Diadelphia 171
LECTURE XXXIV.—Syngenesia 175
LECTURE XXXV.—Gynandria 180
LECTURE XXXVI.—Monœcia.—Diœcia 182
LECTURE XXXVII.—Cryptogamia 187

PART IV.

LECTURE XXXVIII.—The Flowering Seasons of Plants 194
LECTURE XXXIX.—Habits of Plants.—Agents which affect their Growth.—Their Habitations.—Geographical Situations.—Elevation corresponding to Latitude 202
LECTURE XL.—Plants as affected by Cultivation.—Change of Organs.—Diseases.—Economical Uses 209
LECTURE XLI.—History of Botany from the Creation of the World to the Discovery of America 214
LECTURE XLII.—History of Botany from the beginning of the 16th Century to the time of Linnæus.—From the time of Linnæus to the present 222
LECTURE XLIII.—General Views of Nature.—Organized and Inorganized Bodies.—Classification of Animals 233

PART V.

The Natural System of Classification 243
Polypetalous Orders 245
Monopetalous Orders 267
Apetalous Orders 278
Supplement 299

PART VI.

Genera referred to Natural Orders 333
Description of Genera 340
Description of Species 375
Index and Vocabulary 494
Symbolical Language of Flowers 509
Common Names of Plants 511

INTRODUCTION.

LECTURE I.

IMPORTANCE OF SYSTEM.—ADVANTAGES TO BE DERIVED FROM THE STUDY OF BOTANY.

Division of the Lectures.

1. The universe consists of *matter* and *mind.* By the faculties of mind with which God has endowed us, we are able to examine into the properties of the material objects by which we are surrounded. If we had no sciences, nature would present the same phenomena as at present. The *heavenly bodies* would move with equal regularity, and preserve the same relative situations, although no system of Astronomy had been formed. The *laws of gravity and of motion* would operate in the same manner as at present, if we had no such science as Natural Philosophy. The affinities of substances for each other were the same, before the science of Chemistry existed, as they are now. The *characters which distinguish families of plants, and the laws of the vegetable kingdom, do not depend on the discoveries of Botanical science.* It is a truth which cannot be too much impressed upon the mind, in all scientific investigations, that no systems of man can change the laws and operations of Nature; though by systems we are enabled to gain and perfect a knowledge of these laws and relations.

2. The Deity has not only placed before us an almost infinite variety of objects, but has given to our minds the *power of reducing them into classes*, so as to form beautiful and regular systems, by which we can comprehend, under a few terms, the vast number of individual things, which would, otherwise, present to our minds a confused and indiscriminate mass. This power of the mind, so important in classification, is that of *discovering resemblances.* We perceive two objects, we have an idea of their resemblance, and we give a common name to both; other similar objects are then referred to the same class, or receive the same name. A child sees a flower which he is told is a rose; he sees another resembling it, and nature teaches him to call that, also, a rose. On this operation of the mind

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1 By the faculties of mind we examine the properties of matter.—2. Power of the mind to form classes depends the power of forming classes, or of *generalizing.* Some relations or resemblances are seen at the first glance; others are not discovered until after close examination and reflection; but the most perfect classification is not always founded upon the most obvious resemblances. A person ignorant of Botany, on beholding the profusion of flowers which adorn the face of nature, would discover general resemblances, and form in his mind some order of arrangement; but the Botanist learns to distinguish the least conspicuous parts of a plant as most important in a system of classification.

3. *System* is necessary in every science. It not only assists in the acquisition of knowledge, but enables us to retain what is thus acquired; and, by the laws of association, to call forth at will what is treasured up in the storehouse of the mind. System is important not only in the elevated departments of science, but is essential in the common concerns of ordinary life. In conducting any kind of business, and in household operations, it is indispensable to the success of the one, and the comfort of those interested in the other. The logical and systematic arrangement which prevails in Botanical science, has a tendency to produce the habit and love of order. Whoever traces this system through its various connections, by a gradual progress from individual plants to general classes, and then descends, in the same methodical manner, from generals to particulars, must acquire a habit of arrangement, and a perception of order, which is the true, practical logic.

4. *The study of Botany seems peculiarly adapted to females:* the objects of its investigation are beautiful and delicate;—its pursuits, leading to exercise in the open air, are conducive to health and cheerfulness. It is not a sedentary study which can be acquired in the library, but the objects of the science are scattered over the surface of the earth, along the banks of the winding brooks, on the borders of precipices, the sides of mountains, and the depths of the forest. *A knowledge of Botany is necessary to the medical profession.* Our Almighty Benefactor, in bestowing upon us the vegetable tribes, has not only provided a source of refined enjoyment in the contemplation of their beautiful forms and colors, and in their fragrance, by which in their peculiar language, they seem to hold secret communion with our minds;—He has not only given them for our food and clothing, but with kind, parental care, has, in them, provided powers to counteract and remove the diseases to which mankind are subject. For many ages, plants were the only medicines known, or used; but modern discoveries in

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3. Importance of system—Practical logic.—**4.** Proper study for females—Necessary to the medical profession.

Chemistry, by forming compounds of previously existing elements, have, in some degree, superseded their use. Although the science of medicine has received much additional light from Chemistry, it may in modern days have occupied the attention of medical men too exclusively; inducing them to toil in their laboratories to form those combinations which nature has done more perfectly in the plants which they pass unheeded; for, in reality, the medicinal productions of the animal and mineral kingdoms bear but a small proportion to those of the vegetable. When our forefathers came to this country, they found the natives in possession of much medical knowledge of plants. Having no remedies prepared by scientific skill, the *Indians* were led, by necessity, to the use of those which nature offered them; and, by experience and observation, they had arrived at many valuable conclusions as to the qualities of plants. Their mode of life, leading them to penetrate the shades of the forest, and to climb the mountain precipices, naturally associated them much with the vegetable world. The Indian woman, the patient sharer in these excursions, was led to look for such plants as she might use for the diseases of her family. Each new and curious plant, though not viewed by her with the eye of a botanist, was regarded with scrutinizing attention; the color, taste, and smell were carefully remarked, as indications of its properties. But the discoveries and observations of the Indians have perished with themselves; having had no system for the classification or description of plants, nor any written language by which such a system might have been conveyed to others, no other vestige remains than uncertain tradition, of their knowledge of the medicinal qualities of plants.

5. The study of nature, in all her forms, is highly interesting and useful. But the *heavenly bodies* are far distant from us;—and were they within our reach, are too mighty for us to grasp; our feeble minds are overwhelmed in the contemplation of their immensity. *Animals*, though affording the most striking marks of designing wisdom, cannot be dissected and examined without painful emotions. The *vegetable world* offers a boundless field of inquiry, which may be explored with the most pure and delightful emotions. Here, the Almighty manifests himself to us, with less of that dazzling sublimity which it is almost painful to behold in His more magnificent creations; and it would seem that, accommodating the vegetable world to our capacities of observation, He had especially designed it for our study and amusement, as well as our sustenance and comfort.

Experience of the Indians with respect to plants —5. Study of nature—Various departments.

6. The study of Botany naturally leads to greater love and reverence for the Deity. It may not always produce this effect; for, unhappily, there are some minds which, though quick to perceive the beauties of nature, seem blindly to overlook Him who spread them forth; they can admire the gifts, while they forget the giver. But those who feel in their hearts a love to God, and who see in the natural world the workings of His power, can look abroad, and, adopting the language of a Christian poet, exclaim,

> "*My Father* made them all."

7. *Division of the Lectures.* We will divide our course of study as follows, viz.:

PART I. ANALYSIS OF PLANTS, or PRACTICAL BOTANY.
PART II. ELEMENTARY BOTANY; and VEGETABLE PHYSIOLOGY.
PART III. CLASSIFICATION;—*Systems of Botany;* the *Linnæan System*, with some of the most interesting *Genera*, and *Natural Families* found under each class and order.
PART IV. *Progressive appearance of Flowers;* their various phenomena, and *geographical distribution;* HISTORY OF BOTANY; and GENERAL VIEW OF NATURE.
PART V. The NATURAL SYSTEM.

PART VI. The FLORA, or *Descriptions of Genera and Species.*

6. Study of Botany favorable to piety.—7. Division of the course of study

PART I.

LECTURE II.

GENERAL DIVISION OF SCIENCES.—DEPARTMENTS OF BOTANICAL SCIENCE.—PARTS OF A FLOWER.—ANALYSIS OF PLANTS.

8. The Universe, as composed of *mind* and *matter*, gives rise to various sciences. The knowledge of *mind* may be considered under *two general heads:* Theology,[*] or that science which comprehends our views of the Deity, and our duties to Him; Philosophy of the human mind, or *metaphysics*,[†] which is the science that investigates the mind of man, and analyzes and arranges its faculties.

9. The knowledge of *matter*, which is included under the general term, *Physics*, may be considered under *three general heads:* Natural Philosophy, which considers the effects of bodies acting upon each other by their mechanical powers, as their weight and motion; Chemistry, in which the properties and mutual action of the elementary atoms of bodies are investigated; Natural History, which treats of the external forms and characters of objects, and arranges them in classes.

Natural History is divided into *three branches:* Zoology,[‡] which treats of animals; Botany, which treats of plants; Mineralogy, which treats of the unorganized masses of the globe, as stones, earths, &c.; Geology, which treats of minerals as they exist in masses, forming rocks, is a branch of mineralogy.

Departments in Botany.

10. Botany treats of the Vegetable kingdom. It comprehends the knowledge of the nature of plants, their structure and habits, with the relations they bear to each other, and to the mineral and animal kingdoms.

The classification of plants by *means of comparing their different organs is termed* Systematic Botany. The *knowledge of the relations and uses of the various parts of plants with respect to each other, is termed*, Physiological Botany. This department includes Vegetable Anatomy, or Structural Botany.

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[*] From the Greek *Theos*, God, and *logos*, a discourse.

[†] From *meta*, beyond, and *phusis*, nature. This term originated with Aristotle, who, considering the study of the intellectual world as beyond that of the material world, or physics, called it *meta ta phusis*.

[‡] From *zoe*, life, and *logos*, a discourse.

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8. Divisions of the sciences which relate to mind.—9. Those which relate to matter.—10. Definition of Botany—Divisions of the subject.

11. Systematic Botany is divided into the *Artificial* and *Natural Systems;* of the latter we shall not at present treat.

The *Artificial System* is founded upon different circumstances of the *pistils* and *stamens.* Linnæus, of Sweden, discovered that these organs are common to all *perfect plants,* and essential to their existence. Taking advantage of this fact, he founded divisions called *Classes* and *Orders,* upon their *number, situation,* and *proportion.* Before the student can learn the principles on which the classification of plants depends, it is necessary to become acquainted with the parts of a flower.

12. We have here the representation of a white lily (Fig. 1). The envelope is called the *corolla,* from *corona,* a crown. The pieces which compose the corolla are called *petals* (Fig. 1, *a*). The *six* thread-like organs within the corolla are called *stamens;* each stamen consists of a *filament* (Fig. 2, *a*), and an *anther* (*b*). The anther contains the *pollen,* necessary to the perfection of the young seed. In the centre of the flower is the *pistil;* this consists of the *ovary* (*d*), the *style* (*e*), and the *stigma* (*f*). The ovary contains the young seeds (*ovules*)*;* these are contained in one or more *cells.* The end of the stem which supports the organs of the flower, is called the *receptacle* (*g*), sometimes *thalamus* or *torus.*

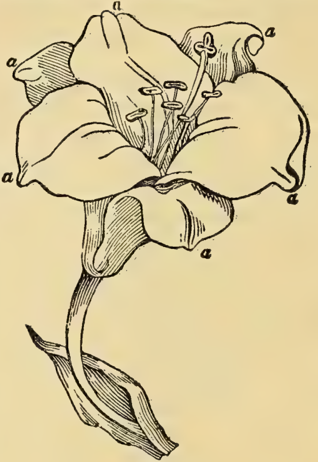

Fig. 1.

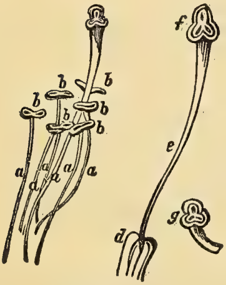

Fig. 2.

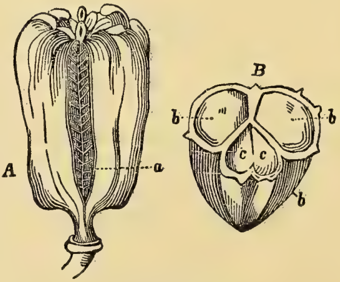

Fig. 3.

When the seed is ripe, the ovary is called the *pericarp*

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11. Systematic Botany, how divided ?--Artificial Method.—12. Parts of a Flower.

Pericarps are of different kinds; that of the lily is called a *capsule* (Fig. 3, *A*); it is of a dry, membraneous texture; and, when ripe, opens by the separation of pieces, called *valves*. In the capsule (*a*) is seen a longitudinal opening, with fibers connecting the valves, as appears in a mature state. Fig. 3, *B*, represents the capsule, cut transversely, to show its three cells (*b*); each cell contains two triangular seeds (*c*). The lily is deficient in one organ, common to the greater part of flowers; this is the *calyx*, or cup, which is usually green, and surrounds the lower part of the corolla, as in the pink and rose. When the calyx consists of several pieces, these are called *sepals*.

The organs of the flower, called also *organs of fructification* or *reproduction*, are as follows:

Calyx—the cup, surrounding the corolla; the parts are sepals.
Corolla—the blossom; the parts are petals.
Stamens—next within the corolla; the parts are the anther, pollen, and filament.
Pistil—central organ; the parts are the ovary, style, and stigma.
Receptacle—which supports the other parts of the flower.

Besides these, there are in the mature plant, the *Pericarp—containing the seed; and the Seed—the rudiment of a new plant.*

Division of Plants into Classes, &c.

13. According to the system with which we shall commence our study, all plants are divided into *twenty-one classes*. Each class is divided into Orders, the Orders into Genera, and the Genera into Species.

a. The name of the *genus* may be compared to a family name; that of the *species*, to an individual or Christian name; for example: the Rose family contains many different species; as *Rosa alba*, the white rose; *Rosa damascena*, the damask rose, &c. The specific or individual name, in Botany, is placed after the family name, as *Rosa alba*, rose white, in the Latin language the adjective being generally placed after the noun.

LECTURE III.

METHOD OF ANALYZING PLANTS.—ANALYSIS OF THE PINK, LILY, ROSE, AND POPPY.

14. As it is not possible to explain all *new terms* as we proceed, the student is referred to the *Vocabulary;* by the observation of plants, connected with definitions, the technical terms of Botany will soon become familiar.*

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* In analyzing a natural flower it is necessary to separate the parts; first, if there be a calyx, remove it carefully, then take off the corolla, or if it be monopetalous, divide it lengthwise with a knife. A microscope is necessary, if the organs be very small.

Enumeration of the parts of a flower.—13. Division of Plants into Classes, Orders, &c.—Genera—Species.—14. Steps in the Analysis of the pink.

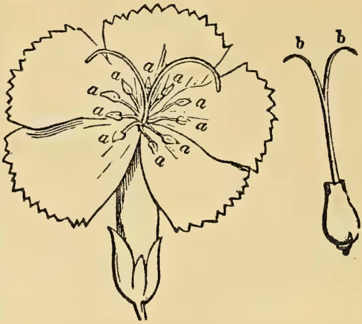

Fig. 4.

The *first* step in analyzing a flower, according to the Linnæan System, is *to find the class.* *We will*, as we are now beginning the analysis of plants, *suppose* this flower to belong to one of the *first ten classes;* we have to ascertain the *number of stamens*, as by this circumstance these ten classes are arranged. Because there are *ten* stamens (Fig. 4, *a*), this flower is in the tenth class, the name of which is, *Decandria.* The *second* step is to find the *order.* In the first twelve classes, the orders depend on the number of pistils; here are *two* (Fig. 4, *b*), and the flower belongs to the second order;—the name of which is Digynia. Sometimes there may be but *one* ovary, and more than one style or sessile stigma. The number of styles, or sessile stigmas, determines the orders, if the plant belong to one of the first twelve classes. In the pink, we have two sessile stigmas, for though they resemble styles, they are found, throughout their extent, to contain pollen; the style is therefore considered as wanting. The *third* step is to ascertain the *genus.* Let the student turn to the description of the 'Genera of Plants" (page 354, Appendix), find Class 10th, Order 2d, and compare the plant with each *genus* until the true one be found.

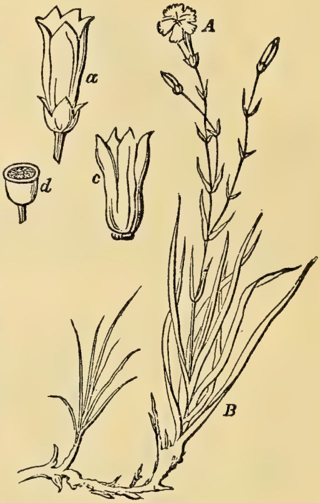

Fig. 5.

'HYDRANGEA.—*Calyx* 5-*toothed, superior;*' —this calyx is 5-toothed (see Fig. 5, *a*), but it is not *superior*, that is, it is not *above* the germ. 'SAXIFRAGA.—*Calyx* 5-*parted, half superior*,'—but this calyx is not half superior, or partly above the germ. 'SAPONARIA.—*Calyx inferior*, 1-*leafed, tubular*, 5-*toothed*,'—so far the description agrees with the Pink; next, '*calyx without scales.*' In this particular, this flower, the calyx of which has scales (Fig. 5, *b*), does not correspond with the description. 'DIANTHUS.—*Calyx inferior, cylindrical*, 1-*leafed, with* 4 *or* 8 *scales at the base; petals* 5 (Fig. 4, *a*), *with claws* (*long and slender at the base*)*;—capsule cylindrical*, 1-*celled, dehiscent.*' Fig. 5, at *c*, represents the ripe capsule of the pink opening at the top by the parting of its valves;—at *d*, it appears cut transversely, showing that it has but one cell, and many seeds. This flower agreeing with every particular in the description of the last-mentioned genus, you may be certain that DIANTHUS is the *generic or family name.* But there are several *species* in this genus; we wish to know to which the Pink belongs; and this process constitutes a *fourth* step in our analysis. We turn to the *Description of Species of Plants** (Appendix, page 404,) and look for Dianthus; we compare the description of each species with our flower, having the leaves and stem before us (Fig 5, *A*, *B*); '*Armeria, flowers aggregate*' (in a thick cluster); this does not agree; we must look further. '*Barbatus, flowers fascicled*' (crowded together), but this flower grows singly on each stalk. '*Caryophyllus, flowers solitary, scales of the calyx sub-rhomboid, very short, petals crenate,*

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* See Description of Species, page 404.

beardless;' the 'leaves are *linear*,' '*subulate*,' or pointed at the end; '*channeled*, or furrowed.

We have now found the botanical name of this plant to be DIANTHUS *caryophyllus;* and that it belongs to,

Class 10th, DECANDRIA. Order 2d, DIGYNIA.

In this way it should be labeled for an *herbarium*, giving also the name of the *Natural* family, which in due time the student will be instructed to find.

In this process, *four* distinct steps have been taken: 1st, to find the class; 2d, the *order;* 3d, the *genus;* and 4th, the *species.*

We can now proceed in the same manner with the analysis of any plant which belongs to the first ten classes, as all these classes depend upon the *number* of stamens.

15. In analyzing a Lily, if natural flowers are not at hand, let the student refer to Figures 1st, 2d, and 3d; this flower belongs to the 6th class, HEXANDRIA; 1st order, MONOGYNIA. (See Class 6th, Order 1st, page 349, Appendix.) This order, containing many genera, is divided into several *sections;* 1st, contains flowers, '*with a calyx and corolla.*' The Lily has no calyx, therefore it is not in this section; 2d, '*Flowers issuing from a spatha.*' The Lily has no spatha, 'or sheath at its base,' therefore it is not in this section; 3d, '*Flowers with a single, corolla-like perianth.*' The Lily has such a corolla-like envelope, therefore we may expect to find it described under this section; we proceed to compare each genus with our flower, till we find one which corresponds with the Lily. 'HEMEROCALLIS; '*Corolla six-parted;*' this shows that the corolla is all of one piece,* with six divisions in the border. The Lily has six petals, therefore look no further in this genus. 'LILIUM;' We compare each particular in this description with our flower, and find an agreement in every respect. In the description of a genus, the different organs of *the flower* are considered; in the species, the distinctions are chiefly drawn from different circumstances of the *leaves, stems, &c.* The flowers of two plants may agree in the organs of fructification, while the leaves, stalks, and branches, are very unlike; in this case, the plants are considered as belonging to different species of the same genus. Thus, the shape of the leaves, the manner in which they grow on the stem, the hight of the stem, with the number of flowers growing upon it, the manner in which they grow, whether erect or nodding, these, and other circumstances, distinguish the different species. The color, a quality of the flower usually the most striking, is, in botany, little regarded.

a. In the 11th class, Icosandria, and the 12th class, Polyandria, we are to remark, not only the number of stamens, which is always more than ten; but the *manner in which they are inserted*, or the part of the flower on which they are situated. If, in pulling off the corolla, the *stamens remain upon* the calyx, the plant belongs to the 11th class; but if the corolla and calyx may be both removed, and the stamens still remain on the receptacle, the plant is of the 12th class. It is said that no poisonous plant has the stamens growing on the calyx; in the 11th class we find many of our most delicious fruits, as the Apple, Pear, &c.

16. The *Rose*, on account of its beauty, is a conspicuous flower in the 11th class; it is often dignified with the title of "queen of flowers."

a. We perceive, on examining the Rose, that its numerous *stamens are attached to the calyx.* A more perfect idea of their situation may be obtained by removing the petals, and cutting the calyx longitudinally. Therefore, because it has more than ten stamens growing upon the calyx, it belongs to the 11th class, Icosandria. The pistils being more than ten, it is of the 13th order, Polygynia. It belongs to the genus Rosa. The shape of the calyx is '*urnform;*' the calyx is '*inferior*,' '*five*

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* We shall use the terms monopetalous and polypetalous, as botanists have been accustomed to do in descriptions of plants, though, according to the later theories, monopetalous corollas consist of several *cohering* petals, and should be called *gamopetalous* (from *monos*, one, and *gamos*, union), or *united* petals.

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15. Analysis of the Lily—Parts of the plant referred to in describing the genus and the species—New circumstances to be considered in the 11th and 12th classes.—16. Analysis of the Rose.—*a.* Why is it in the 11th class?—why the 13th order?—Generic characters of the Rose.

cleft,' '*fleshy,*' '*contracted* toward the top;' '*petals* 5' (this is always the case with a rose in its natural state, unassisted by cultivation); '*seeds numerous, bristly, fixed to the sides of the calyx within.*' There is no seed-vessel, or proper pericarp, to the Rose; but the calyx swells, and becomes a dry, red berry, containing many seeds.

b. The genus Rosa contains many *species*, distinguished one from another by the different shape of the germ, the smoothness or roughness of the stems, the presence or absence of thorns, the shape of the leaves, and the manner in which the flowers grow upon the stalks, whether solitary, crowded together in pairs, or scattered, and whether they are erect or drooping. The Moss-rose (Rosa *muscosa*) is distinctly marked by the hairs resembling moss, which cover the stems of the calyx; these hairs are a collection of glands containing a resinous and fragrant fluid.

c. The apple-blossom appears like a little rose; its calyx becomes thick and pulpy, and at length constitutes that part which we usually call the fruit, though, strictly speaking, the seed only is the fruit. On examining an apple the five divisions of the calyx appear at the end opposite the stem.

17. The Poppy affords a good illustration of the 12th class, Polyandria; here are numerous stamens, always *more than ten*, sometimes more than a hundred, growing upon the receptacle; the Poppy has but one pistil, and therefore belongs to the first order, Monogynia; the genus is Papaver. The Poppy has a '*calyx of two leaves or sepals,*' but these fall off as soon as the blossom expands, and are therefore called '*caducous;*' the corolla (except when double) '*is four-petaled;*' it has no style, but the stigma is set upon the large *ovary*, and is therefore said to be *sessile.*

a. The ovary is somewhat oblong, the stigma is flat and radiated. The pericarp is one-celled, it opens at the top, by pores, when the seeds are ripe. The species of Papaver which is cultivated in gardens (*opium*-poppy) is the *somniferum*, which name signifies to produce sleep.

b. The analysis of even a few flowers cannot fail of suggesting thoughts of the beauty of a system which so curiously identifies the different plants described by botanists, and points to each individual of the vegetable family the place it must occupy.

18. In the commencement of a new science, it is not to be expected that every idea, or principle of arrangement, will seem perfectly clear, as such may often relate to principles not yet explained. It would be impossible to form a clear idea of the use or beauty of a particular part of an edifice, except considered in its relation to the whole. The beginner, in any branch of scientific knowledge, is not like one traveling a straight road, where every step is so much ground actually gained; but the views which he takes are like the faint sketches of a painter, which gradually brighten, and grow more definite as he advances. It is by some supposed that students should learn *perfectly* every thing as they proceed; but this idea appears to be founded upon a wrong view both of the nature of the mind, and of the sciences. The memory may be so disciplined as to retain a multitude of words, but words are only valuable as instruments of conveying knowledge to the mind; and if, after a careful attention to a subject, some parts may appear obscure, the student must not be discouraged; the subject may be connected with something which is to follow, therefore he should patiently proceed, in the expectation that difficulties will gradually disappear.

a. The student is now supposed to be prepared to analyze flowers of any of the first thirteen classes; but it is necessary, before proceeding further, to remark, that the two circumstances of the *number* and *insertion* of the stamens, are not all that are to be considered, in the arrangement of the classes.

19. It is necessary to commit to memory the Latin and Greek numerals, to understand the names given to the classes and orders. It is not in Botany alone, that a knowledge of these numerals is useful; many words in common use are compounded with them; as, *uniform*, from *unus*, one, and *forma*, form;—*octagon*, from *octo*, eight, and *gonia*, an angle, *hexagon*, *pentagon*, &c.

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b. Circumstances which distinguish the different species of the genus Rosa.—c. Apple-blossom and fruit.—17. Analysis of the Poppy—The analysis of a few flowers useful.—18. Remarks.—Words of use only as instruments.—*a*. Remark.

NUMERALS.

Latin.	Numbers.	Greek.	Latin.	Numbers.	Greek.
Unus,	1.	Monos, single.	Duodecem,	12.	Dodeka.
Bis,	2.	Dis,—twice.	Tredecem,	13.	Dekatreis.
Tres,	3.	Treis.	Quatuordecem,	14.	Dekatettares
Quatuor,	4.	Tettares.	Quindecem,	15.	Dekapente
Quinque,	5.	Pente.	Sexdecem,	16.	Dekaex.
Sex,	6.	Hex.	Septendecem,	17.	Dekaepta.
Septem,	7.	Hepta.	Octodecem,	18.	Dekaokto.
Octo,	8.	Okto.	Novemdecem,	19.	Dekaennea.
Novem,	9.	Ennea.	Viginti,	20.	Eikosi.
Decem,	10.	Deka.	Multus,	Many.	Polus.
Undecem,	11	Endeka.			

LECTURE IV.

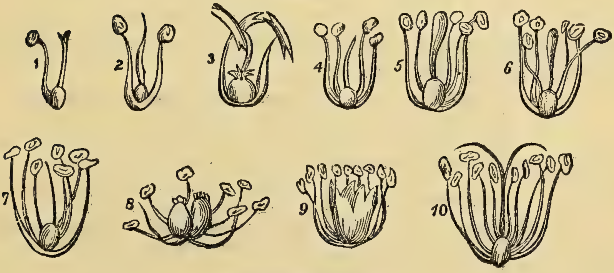
THE CLASSES AND ORDERS OF LINNÆUS.

20. ALL plants are arranged in two grand divisions; *Phenogamous*, stamens and pistils visible; and *Cryptogamous*, stamens and pistils not visible. The former division includes the first 20 classes; the latter division, the 21st or last class. The CLASSES are *founded* upon distinctions observed in the STAMENS. All known plants are divided into *twenty-one classes*. The first twelve classes are *named* by prefixing Greek numerals to ANDRIA, which signifies *stamen*.

CLASSES.

	Names.	Definitions.
Number of Stamens.	1. MON-ANDRIA,	*One Stamen.*
	2. DI-ANDRIA,	*Two Stamens.*
	3. TRI-ANDRIA,	*Three* "
	4. TETR-ANDRIA,	*Four* "
	5. PENT-ANDRIA,	*Five* "
	6. HEX-ANDRIA,	*Six* "
	7. HEPT-ANDRIA,	*Seven* "
	8. OCT-ANDRIA,	*Eight* "
	9. ENNE-ANDRIA,	*Nine* "
	10. DEC-ANDRIA,	*Ten.* "

Fig. 6.



Number of Stamens.

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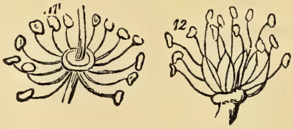
19. Latin and Greek numerals.—20. Two grand divisions of plants—Classes, on what founded ?—how many ?—first twelve, how named ?

Number of Stamens, and their position, relative to the Calyx and Receptacle.	11. Icos-andria,* (Eikosi.) 20	*Over ten Stamens inserted on the Calyx.*
	12. Poly-andria, (Polus.) many.	*Over ten Stamens inserted on the Receptacle.*

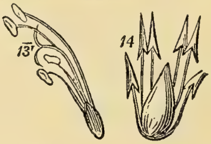
Fig. 7.



The 13th and 14th classes are named by prefixing Greek numerals to Dynamia, which signifies *power* or length.

Number and relative length of Stamens.	13. Di-dynamia,	*Two Stamens longer or more powerful than the other two.*
	14. Tetra-dynamia,	*Four Stamens longer or more powerful than the other two.*

Fig. 8.



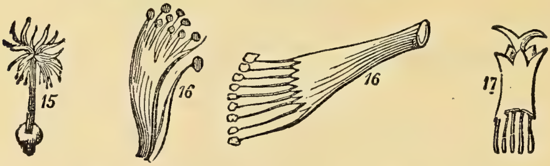
The 15th and 16th classes are named by prefixing Greek numerals to the word adelphia, which signifies *brotherhood.*

Connection of Stamens either by filaments or anthers.	15. Mon-adelphia,	*Stamens united by their filaments in one set or brotherhood.*
	16. Dia-delphia,	*Two brotherhoods.*

The 17th class is named by prefixing Syn, signifying *together*, to Genesia, which signifies *growing up*.

	17. Syn-genesia,	*Five united anthers, flowers compound (in a head).*

Fig. 9.



The 18th class is named by an abbreviation of the word gynia, which signifies pistil, prefixed to andria, showing that the stamens and pistils are united.

Position of Stamens relative to the Pistil.	18. Gyn-andria,	*Stamens growing out of the Pistil.*

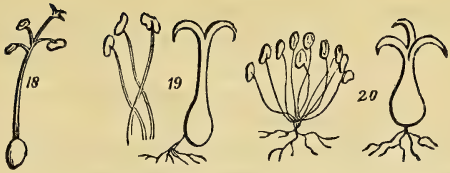
The 19th and 20th classes are named by prefixing numerals to œcia, which signifies a house.

	19. Mon-œcia,	*Stamens and Pistils on separate corollas upon the same plant, or in one household.*
	20. Di-œcia,	*Stamens and Pistils in separate corollas upon different plants, or in two households.*

* The name of this class does not now designate its character, since the number of stamens is often more or less than twenty.

Classes which depend on the *number* of stamens—*number and position*—*number and relative length*—What classes depend on the *connection of the stamens?*—Explain the signification of their names—What classes depend on the position of the stamens?—What does Gynandria signify?—Monœcia?—Diœcia?

Fig. 10.



The name of the 21st class is a compound of two Greek words, CRYPTO and GAMIA, signifying a concealed union.

Natural Families. 21. CRYPTO-GAMIA, } *Stamens and Pistils invisible, or too small to be seen with the naked eye.*

Lichens.

Mushrooms.

Ferns.

Mosses.

The number of classes as arranged by Linnæus, was twenty-four. Two of them, Poly-adelphia (many brotherhoods), which was the eighteenth class; and Polygamia (many unions), the twenty-third class, are now, by many botanists, rejected as unnecessary. The eleventh class, Dodecandria, which included plants whose flowers contain from twelve to twenty stamens, has been more recently omitted. The plants which were included in these three classes, have by most botanists been distributed among the other classes.

The Orders of Linnæus.

21. The ORDERS of the first twelve classes are founded upon the number of PISTILS; they are named by prefixing Greek numerals to the word, GYNIA, signifying *pistil.*

ORDERS.

	Names.	No. of pistils.	
Orders found in the first twelve classes.	1. MONO-GYNIA,	1.	
	2. DI-GYNIA,	2.	
	3. TRI-GYNIA,	3.	
	4. TETRA-GYNIA,	4.	
	5. PENTA-GYNIA,	5.	
	6. HEXA-GYNIA,	6.	*this order seldom found.*
	7. HEPTA-GYNIA,	7.	*this still more unusual.*
	8. OCTO-GYNIA,	8.	*very rare.*
	9. ENNEA-GYNIA,	9.	*very rare.*
	10. DECA-GYNIA,	10.	
	13. POLY-GYNIA, *over ten pistils.*		

The classes vary as to the number of orders which they contain. The orders of the 13th class, Didynamia, are but two.

1. GYMNOSPERMIA. From GYMNOS, signifying naked, and SPERMIA, signifying seed, implying that the seeds are not covered by a seed-vessel.

Seeds usually four, lying in the calyx.

What does Cryptogamia signify?—Classes omitted. 21. Orders of the first twelve classes, on what founded?—How are the orders named?—Orders of the class Didynamia.

2. ANGIOSPERMA. From ANGIO, signifying bag or sack, added to SPERMIA, implying that the seeds are covered.

Seeds numerous in a capsule.

The orders of the 14th class, Tetradynamia, are two, both distinguished by the form of the fruit.

1. SILICULOSA; fruit, a *silicula*, or *roundish* pod.
2. SILIQUOSA; fruit, a *siliqua*, or *long* pod.

The *orders* of the 15th class, Monadelphia, and of the 16th class, Diadelphia, are founded on the *number of stamens;* that is, on the characters of the first twelve classes, and they have the same names, as Monandria, &c.

The 17th class, Syngenesia, has its five orders distinguished by different circumstances of the florets, as:

1. EQUALIS; stamens and pistils *equal*, or in proportion; that is, each floret has a *stamen*, a *pistil*, and one seed. Such florets are called *perfect*.
2. SUPERFLUA; florets of the *disk perfect*, of the *ray* containing *only pistils*, which without stamens are *superfluous*.
3. FRUSTRANEA; florets of the *disk perfect*, of the *ray neutral*, or without the stamen or pistil; therefore *frustrated*, or useless.
4. NECESSARIA; florets of the *disk staminate*, of the *ray pistillate;* the latter being *necessary* to the perfection of the fruit.
5. SEGREGATA; florets *separated from each other by partial calices*, or each floret having a perianth.

The *orders* of the 18th class, Gynandria, of the 19th class, Monœcia, and the 20th class, Diœcia, depend on the *number of stamens*.

The orders of the 21st class, Cryptogamia, constitute six natural families.

1. FILICES,—includes all *Ferns*, having the fruit on the leaves.
2. MUSCI,—Mosses.
3. HEPATICAE,—Liverworts, or succulent mosses.
4. ALGAE,—Sea-weeds, and other aquatic vegetable productions.
5. LICHENES,—Lichens, found growing on the bark of old trees, old wood, &c.
6. FUNGI,—Mushrooms, mold, blight, &c.

Note.—No confusion is produced in taking the character of some classes, for orders in other classes; for example: if we have a flower with ten stamens, *united by their filaments into one set*, we know by the definition of the classes that it belongs to the *class* Monadelphia; because it has ten stamens, it is in the *order* Decandria.

Of Tetradynamia—Of the classes Monadelphia and Diadelphia—Of the class Syngenesis—Of the classes Gynandria, Monœcia, and Diœcia—Of the class Cryptogamia.

LECTURE V.

METHOD OF ANALYZING PLANTS BY A SERIES OF COMPARISONS—GENERAL REMARKS UPON PLANTS, ETC.

22. The dissection of a plant is, properly, *analysis;* the meaning of the term being a separation: but when we speak of *analyzing plants*, we mean that by examining each part of the flower, we learn the Class, Order, Genus, and Species of the plant. A person engaged in ascertaining the name of a plant, may be said to be upon a *Botanical Journey ;* and the plant being his Directory, if he can read the botanical characters impressed on it by the hand of Nature, he will, by following system, soon arrive at his journey's end.[*]

Let us suppose, then, we have before us a plant in blossom, of whose *name* and *properties* we are ignorant.—The *name* must be first ascertained. Following the Linnæan System: in the first place we have *two comparisons* to make—Whether the *Stamens* and *Pistils* are VISIBLE or INVISIBLE. If the Stamens and Pistils are not visible, we have already arrived at the class, which is CRYPTOGAMIA. If, however, the *Stamens* and *Pistils* are *visible*, we have two *comparisons* to make—Whether the flowers have *stamens and pistils* on the same or *different corollas.* If the Stamens and Pistils are on different flowers, we then shall find the plant either in the class *Diœcia* or *Monœcia*, according as the Stamens and Pistils are on different flowers, proceeding from the same root, or from different roots.

But if the plant has the Stamens and Pistils both inclosed in the *same corolla*, we must next examine—Whether the *Anthers* are *separate*, or *united.* If we find *five anthers united* around the *pistil*, we have found the class of the plant; it is SYNGENESIA.

If the *Anthers* are separate, we must proceed to a *fourth stage*, and see—Whether the *filaments* are *separate*, or *united* with each *other*, or to the *pistil.* If the latter circumstance is ascertained, we need search no further; the plant is in the class GYNANDRIA.

If the flower has not the filaments united to the pistil, we must ascertain if the filaments are united with each other; if they are so, and in two parcels or sets, the flower is in the class DIADELPHIA.

If in *one* parcel or *set*, it is in the class MONADELPHIA.

But if the *filaments* are *separate*, we must next examine—Whether these are of *similar*, or of different lengths. (Of different *lengths*, those only which have *four* or *six stamens* are to be regarded.) If we find the flower has *six stamens*, *four long*, and *two short*, we need go no further, this is the class TETRADYNAMIA. If the flower has four stamens, two long, and *two short*, it is in the class DIDYNAMIA.

If the flower comes under none of the foregoing heads, we must then count the number of stamens; if these amount to *more* than ten, we must then consider their *insertion*, as, whether inserted *on the calyx or corolla*, or, *on the receptacle.* If we find the stamens inserted on the *receptacle*, the flower is in the class POLYANDRIA; but if on the *calyx* or *corolla*, it is in ICOSANDRIA.

If our flower has less than twenty stamens, with none of the peculiarities above mentioned, of *connection*, *position*, or *length*, we have only to count the number of stamens, in order to be certain of the class; if there are *ten* stamens, it is in DECANDRIA; and so on, through the nine remaining classes. This is the true analytical process; but when we put plants together to form a species, and species together

[*] Thornton.

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22. **Meaning of the word analysis—How used in Botany—What two comparisons to be first made in analyzing a plant—When the stamens and pistils are inclosed in the same corolla ?—When the anthers are separate ?—If the filaments are separate ?—If the flower has not stamens of unequal length ?—When is the flower in one of the first ten classes ?—Difference between analysis and synthesis.**

to form a genus, and genera together to form an order, and orders together to form a class, we then proceed by synthesis, which means putting together.

23. *General Facts relating to Vegetables.*—The solid part of plants, or *tissue*, is composed chiefly of *fibers* and *membranes*, which form *tubes* and *cells* for conveying and containing fluids. When the fibrous portion predominates, the plant becomes tough and woody; and when the cellular structure prevails, the product is tender and succulent. The various vegetable tissues will be considered more fully hereafter. Plants are furnished with pores (*stomata*), by which they imbibe nourishment from surrounding bodies. The part which fixes the plant in the earth and absorbs from it the juices necessary to vegetation, is the *root;* this organ is never wholly wanting. The *stem*, or ascending axis, does not always rise; it sometimes creeps upon the earth, or remains concealed in its bosom; but, generally, the stem ascends either by its own strength, or, as in the case of vines, by supporting itself upon some other body. The divisions of the stem are its *branches;* the divisions of the branches are *branchlets*, or *boughs*. When the vegetable has no stem, the leaves, flower, and fruit grow from the tops of the root; but when the stem exists, that, or its branches, bear them. *Herbs* in which *cellular tissue* abounds, have soft, watery stems, of short duration, which bear flowers once, and then die. *Trees* and *shrubs*, being mostly formed of *fibrous tissue*, have *solid* and *woody* stems; they live and bear flowers many years. Small bodies of a round or conical form, consisting of thin scales, lying closely compacted together, appear every year upon the stems, the boughs, and the branches of trees. They contain the *germs* of the productions of the following years, and secure then from the severity of the seasons. These germs, and the scales which cover them, are called *buds*. The buds of the trees and shrubs of equinoctial countries, have few scales, as they are less needed for protection against inclemencies of weather. *Leaves* like flowers proceed from buds; they are the lungs of vegetables; they absorb water and carbonic acid from the atmosphere, decompose them by the action of rays of light, and exhale or give out oxygen gas. They are tough and dry, soft and watery, in proportion as the fibrous or cellular tissue prevails.

Vegetables, like animals, produce others of their kind, and thus perpetuate the works of creation. The organs essential to the perfection of plants, are the stamens and pistils. The presence of a stamen and pistil constitutes what is called a *perfect* flower; but, in general, these organs are surrounded with an

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23. Tissue—Stem—Branches—Boughs—Herbs—Trees and Shrubs—Buds—Leaves—Essential organs.

inner envelope, called the *corolla*, and an outer one, called the *calyx*. When there is but one envelope, as in the tulip, this is often called by the more general term of *perianth*, which signifies, surrounding the flower. Persons ignorant of botany, give exclusively the name of *flower* to these envelopes, which are often remarkable for the brilliancy of their colors, the elegance of their forms, and the fragrance of their perfumes.

24. *Method of preserving Plants, and of preparing an Herbarium.*—Plants collected for analysis, may be preserved fresh many days in a close tin box, by occasionally sprinkling them with water; they may also be preserved by placing their stems in water, but not as well by the latter as the former method. The botanical student should keep specimens of all the plants which he can procure. An *herbarium* (*hortus siccus*), neatly arranged, is beautiful, and may be rendered highly useful, by affording an opportunity to compare many species together, and it likewise serves to fix in the mind the characters of plants. It is a good method, in collecting plants for an herbarium, to have a portfolio, or a book in which they may be placed before the parts begin to wilt. Specimens should be placed between the leaves of paper, either newspaper, or any other kind which is of a loose texture, and will easily absorb the moisture of the plants; a board with a weight upon it should then be placed upon the paper containing them; the plants should be taken out frequently at first; as often as once or twice a day, and the paper dried, or the plants placed between other dry sheets of paper. Small plants may be dried between the leaves of a book. Plants differ in the length of time required for drying, as they are more or less juicy; some dry in a few days, others not sooner than two or three weeks. When the specimens are dry, and a sufficient number collected to commence an herbarium, a book should be procured, composed of blank paper (white paper gives the plants a more showy appearance). A quarto size is more convenient than a folio. Upon the first page of each leaf should be fastened one or more of the dried specimens, either with glue, or by means of cutting through the paper and raising up loops under which the stems may be placed. By the sides of the plants should be written the *class, order, generic* and *specific name*, with *natural order;* also the place where found, and the season of the year. The colors of plants frequently change in drying; the blue, pale red, and white, often turn black, or lose their color; yellow, scarlet, violet, and green, are more durable. An herbarium should be carefully guarded against moisture and insects; as a security against the latter, the plants may be brushed over with corrosive sublimate or spirits of turpentine.

25. *Botanical Excursions.*—As a healthful and agreeable exercise, we would recommend to the young, and to others wishing to retain the vigor and elasticity of youth, frequent botanical excursions; we experience most pleasure from the science, by seeing the flowers in their own homes; a dry grove of woods, the borders of little streams, the meadows, the pastures, and even the waysides, afford constant subjects for botanical observations. To the hardier sex, who can climb mountains, and penetrate marshes, many strange and interesting plants will present themselves, which cannot be found except in their peculiar situations; of these, females must be content to obtain specimens, without seeing them in their native wilds. But it is generally easy to obtain such specimens, for there is among the cultivators of natural science, a generosity in imparting to others the treasures which nature lavishes upon those who have a taste to enjoy them.

26. *Poisonous Plants, and those which are not Poisonous.*—In collecting flowers, the student should be cautious with respect to *poisonous* plants. Such as have five stamens and *one pistil*, with a corolla of a dull, lurid color, and a disagreeable smell, are usually poisonous; the thorn-apple (*stramonium*) and the tobacco are examples. The umbelliferous plants, which grow in *wet* places, have usually a

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24 Method of preserving plants, and of preparing an herbarium.—25. Botanical *excursions*.—26. Poisonous plants, &c.

nauseous smell: such plants *are poisonous*, as the water-hemlock. Umbelliferous plants which grow in dry places, usually have an aromatic smell, and *are not poisonous*, as caraway and fennel. Plants with *labiate* corollas, and containing their seeds in capsules, are often poisonous, as the foxglove (Digitalis); also, such as contain a *milky juice*, unless they are compound flowers. Such plants as have horned or hooded nectaries, as the columbine and monk's-hood, are mostly poisonous Among plants which are seldom poisonous, are the compound flowers, as the dandelion and boneset; such as have labiate corollas, with seeds lying naked in the calyx, are seldom or never poisonous; the mint and thyme are examples of such plants. The *Papilionaceous* flowers, as the pea and bean; the *Cruciform*, as the radish and mustard, are seldom found to be poisonous. Such plants as have their stamens standing on the calyx, as the rose and apple, are never poisonous; neither the grass-like plants with glume calyxes, as wheat, rye, and orchard-grass (Dactylis).

27. *Proper Flowers for Analysis.*—In selecting flowers for analysis, we must never take double ones; the stamens (and in many cases the pistils also) change to petals by cultivation, therefore we cannot know by a double flower, how many stamens or pistils belong to it in its natural state. Some botanists seem to view with jealousy the changes made by culture, in the natural characters of plants; they call double flowers, and variegated ones, produced by a mixture of different species, *monsters* and *deformities*. These are harsh expressions to be applied to roses and carnations, which our taste must lead us to admire, as intrinsically beautiful, although their relative beauty, as subservient to scientific illustration, is certainly destroyed by the labor of the florist. The love of native wild-flowers is no doubt greatly hightened by the habit of seeking them out, and observing them in their peculiar situations. A botanist, at the discovery of some lowly plant, growing by the side of a brook, or almost concealed in the cleft of a rock, will often experience more vivid delight than could be produced by a view of the most splendid exotic. Botanical pursuits render us interested in every vegetable production: even such as we before looked upon as useless, present attractions as objects of scientific investigation, and become associated with the pleasing recollections, arising from the gratification of our love of knowledge. A peculiar interest is given to conversation by an acquaintance with any of the natural sciences; and when females shall have more generally obtained access to these delightful sources of pure enjoyment, we may hope that scandal, which oftener proceeds from a want of better subjects, than from malevolence of disposition, shall cease to be regarded as a characteristic of the sex. It is important to the cause of science, that it should become *fashionable;* and as one means of effecting this, the parlors of those ladies who have advantages for intellectual improvement, should more frequently exhibit specimens of their own scientific taste. It is unfortunately too much the case, that female ingenuity (especially in the case of young ladies after leaving school) is in a great degree directed to trivial objects, which have no reference either to utility, or to moral and intellectual improvement. But a taste for scientific pursuits once acquired, a lady will feel that she has no time for engagements which neither tend to the good of others, nor to make herself wiser or better.

Manner of taking impressions of leaves.—Hold oiled paper over the smoke of a lamp until it becomes darkened; to this paper apply the leaf, having previously warmed it between the hands, that it may be pliant. Place the lower surface of the leaf upon the blackened paper, that the numerous veins which run through its extent, and which are so prominent on this side, may receive from the paper a portion of the smoke. Press the leaf upon the paper by placing upon it some thin paper, and rubbing the fingers gently over it, so that every part of the leaf may come in contact with the sooted oil-paper. Then remove the leaf, and place the sooted side upon clean white paper, pressing it gently as before; upon removing the leaf, the paper will present a delicate and perfect outline, together with an accurate exhibition of the veins, which extend in every direction through it, more correct and beautiful than the finest drawing.

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27. Double flowers not proper for analysis—Effect of botanical pursuits—Of an acquaintance with any of the natural sciences.—Female ingenuity too often directed to trivial objects.

PART II.

VEGETABLE PHYSIOLOGY.

LECTURE VI.

IMPORTANCE OF OBSERVING EXTERNAL OBJECTS.—VEGETABLES CONSIST OF TWO SETS OF ORGANS.—OF THE ROOT.

28. The exercises which constitute the principal part of our previous course of lectures, are chiefly designed to assist the student in *practical botany*. It is not expected that the young are to be the *passive receivers* of instruction; in pursuing the study of Botany it is necessary to compare with real objects, the descriptions which are presented. By systematic attention to external objects the mind is disciplined, and prepared the better to pursue abstract studies, where the subjects of investigation cannot, like the plants, be looked at and handled.

a. All our thoughts, by means of the senses, are originally derived from external objects. Suppose an infant to exist, who could neither hear, see, taste, smell, nor feel; all the embryos of thought and emotion might exist within it; it might have a soul capable of as high attainments as are within the reach of any created beings; but this soul, while thus imprisoned, could gather no ideas; the beauty of reflected light, constituting all the variety of coloring; the harmony of sounds, the fragrant odors of flowers, the various flavors, which are derived from our sense of taste, the ideas of soft, smooth, or hard; all must forever remain unknown to the soul confined to a body having no means of communication with the world around it. The soul, in its relation to external objects, may be compared to the embryo plant, which, imprisoned within the seed, would forever remain inert, were no means provided for its escape from this confinement; and no communication opened, between it, and the air, the light, and vivifying influence of the earth.

b. Since our first ideas are derived from external nature, is it not a rational conclusion that we should add to this original stock of knowledge, by a continued observation of objects addressed to our senses? After the years of infancy are past, and we begin to study *books*, should we, neglecting sensible objects, seek only to gain ideas from the learned? or, in other words, should we, in the pursuit of human sciences, overlook the works of God?

29. In plants, as well as animals, each part or organ is intimately connected with the whole; and the vegetable, as well as the animal being, depends for its existence on certain laws of organization. Vegetable organs may be considered under *two classes:* 1st, including such organs as *promote the growth* of the plant, as the root, leaves, &c., called *organs of vegetation;* 2d, such as *perfect the seed*, and thus provide for the reproduction of the species, called *organs of fructification.*

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28. Study of external objects strengthens the mind—Abstract studies facilitated by acquaintance with the natural sciences.—*a.* Our first ideas gained by the senses—Analogy between the soul and the embryo plant.—*b.* We should not confine our attention exclusively to books.—29. Vegetable, as well as animal existence, depends on certain laws of organization—Two kinds of organs of vegetables.

30. STRUCTURE OF THE ROOT.—The Root (*radix*) is the basis of the plant, or that part which usually enters the earth, and extends in a direction contrary to the growth of the stem; it originates with the *radicle* of the seed, supports the plant in an upright position, and at the same time gives nourishment to every part of it. There are exceptions to the general fact of a root being fixed in the ground; some plants, as the pond-lily, grow in water, and are called *aquatic;* some, like the mistletoe, have no root, but fix themselves upon other plants, and derive sustenance from them; such are called *parasites.**

The root consists of the *caudex*, the main body of the root; *fibrils*, the finer branches, which are the true roots; and the *spongioles*, extremities of the root, which are composed of cellular tissue, and *ducts* or mouths, which absorb nutritious juices. The nourishment ascending through the stem experiences in the leaves and green parts of the plant an important change, effected, in part, through the agency of air and light; and a portion of it, through a different set of vessels, flows back, in what is called the returning sap, or *cambium.* The nourishment thus digested is returned to the stem and root, and is expended in the formation of new rootlets and branches. The downward direction of the root is accounted for by the delicacy of the fibers, which causes them to shun the light and air, and also by the effects of gravitation, which they have not the force to resist. The summit of the root, or that part which connects it with the ascending axis, is called the *collum*, or neck; any injury to this part is followed by the death of the plant.

31. DURATION OF ROOTS.—Roots, with respect to *duration*, are *annual*, *biennial*, or *perennial.*

Annual Roots live but one year. They come from the seed in the spring, and die in autumn, including such as are raised from the seed every year; as peas, beans, cucumbers, &c. The flowering process and the maturing of the fruit exhaust the plant, and having no nourishment accumulated in its dry fibrous root, it perishes as soon as its seed is perfected. *Biennial Roots* live two years. They do not produce any flowers the first season; the next summer they blossom, the seeds mature, and the roots die. The roots of cabbages are often, after the first season, preserved during the winter. In the spring they are set out in gardens, and produce flowers; the ovary grows into a pod which contains the seed. The root having performed this office, then dies, and no process can restore it to life. The onion, beet, and carrot, are biennial plants. Their thickened fleshy roots contain within their cells, starch, sugar, &c., and afford a reservoir of nourishment for a new stem and branches for the second year. *Perennial Roots*—are those whose existence is prolonged a number of years to an indefinite period; as the asparagus, geranium, and rose; also trees and shrubs. Climate and cultivation affect the duration of the roots of vegetables. Many perennial plants become annual by transplanting them into cold climates: the garden nasturtion, originally a perennial shrub in South America, has become in our latitude an annual plant.

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* The word *parasite*, from the Greek *para*, with, and *sitos*, corn, was first applied to those who had the care of the corn used in religious ceremonies, and were allowed a share of the sacrifice; afterward it was applied to those who depended on the great, and earned their welcome by flattery.

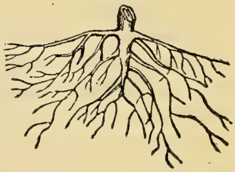
30. The root—Parts of the root.—31 Annual roots—Biennial.

a. Wheat is annual, if sown early in Spring, but biennial if sown in Autumn; the annual Mignonette, by removing its flower-buds the first year, and keeping it in a proper temperature, may be rendered perennial and shrubby. Many flowering plants may be brought to flower later, by pinching off the early blossoms.

b. Perennial roots do not, like the biennial, depend upon the stock of the preceding year, but *annually produce new roots* and form new accumulations; sometimes, as in the Dahlia and Orchis, in separate portions of the root, one portion annually perishing, and a new portion formed; so that the plant is perpetuated, in its offspring, year by year. In the potato the *tuberous* stem performs this office. In trees and shrubs the juicy trunk or stem contains nourishing matter. It is found that the *radicle* continues to extend itself in length; and, strictly speaking, the real root is composed only of those delicate fibers continually forming by the development of new cells, and that these consist of newly formed tissue full of *vitality.*

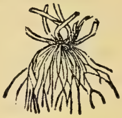
32. Forms of Roots.—The forms of roots depend upon the mode in which the axis descends and branches. Among the varieties in the forms of roots are the following:

Fig. 12.



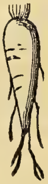
Branching or *ramose* root (Fig. 12). This consists of numerous ramifications, resembling in appearance the branches of a tree; this is the root of most trees and shrubs. Some of these branches penetrate to a great depth in the earth, and others creep almost horizontally near its surface. Experiments have been made, which show, that branches by being buried in the soil may become roots; and roots, by being elevated in the atmosphere, become branches covered with foliage. We often see the upturned roots of trees throwing out leaves. Branching roots terminate in fibers and spongioles; these are in reality the proper roots, as they imbibe through pores the nourishment which the plant derives from the earth. Nature furnishes this nourishment in the moisture and various salts which are contained in the soil. Roots do not form branches in any regular order; the branches of stems, are more or less symmetrical, being produced by the development of buds which have a regular arrangement. Roots are not originally furnished with buds, but sometimes, under peculiar circumstances, produce them. The distance to which the roots of trees extend is sometimes greater than the extent of the branches.

Fig. 13.



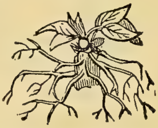
33. The *Fibrous* root (Fig. 13) consists of a collection of thread-like parts; as in many kinds of grasses, and most annual plants. The fibers usually grow directly from the bottom of the stem. The fact that grasses of various kinds will live and flourish in a soil too dry and barren to produce other vegetation is owing to the abundance of the fibers, which absorb all the nourishment that the ground affords.

Fig. 14.



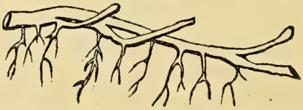
34. The *Spindle* or *fusiform* root; here the fleshy caudex tapers downward, and also near the neck upward, as in the radish (Fig. 14). In the carrot, the root is conical, tapering from the base to the apex. The base of the root is the extremity which is applied to the base of the stem, and the opposite extremity is the apex of the root. The Spindle root is not well provided with the means of imbibing sustenance, on account of a deficiency of radicles. That these are the agents by which the root is nourished, may be proved by immersing a young radish in water until every part is covered except the radicles—the herbage will soon die; but if the radicles of another radish are immersed in water, the plant will live and look fresh for some time. The Spindle root is often *forked*, as in the mandrake.* The *Premorse* root (from *premorsus*, bitten) is so called when the caudex appears as if bitten off (Fig. 15). This is caused by the lower extremity perishing after the first year. (See 31, *b*.) The violet and cowslip furnish examples. The Scabiosa *succisa*, or Devil's bit, received the name on account of a superstitious belief that, as the plant was useful for medicine, the devil out of spite to mankind had bitten off the root.

Fig. 15.



35. The *Creeping root* (Fig. 16), instead of forcing its way perpendicularly into the earth, extends horizontally, and sends out fibers. The term, creeping root, is sometimes improperly applied to the *rhizoma*, or root with a creeping stem, which elongates, and produces leaves or branches. In the Iris, it is half buried in the soil; in some plants, it is

Fig. 16.



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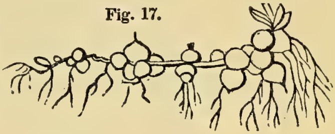
* *Atropa mandragora.* The word mandrake is said to be derived from the German *Mandragen* resembling man.

33. Fibrous roots.—34. Spindle root—Forked spindle root—Premorse root.—35. Creeping root—Its importance in Holland.

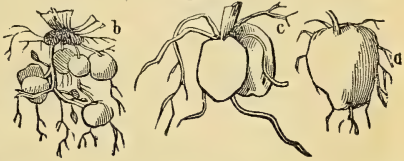
wholly subterranean. This root, by the fibers spreading and interlacing themselves, renders a soil more permanent. Holland would be liable to be washed away by the action of water, were not its coasts bound together by these creeping plants, which will grow in sandy, light soils, that scarcely produce any other vegetation.

Fig. 17.



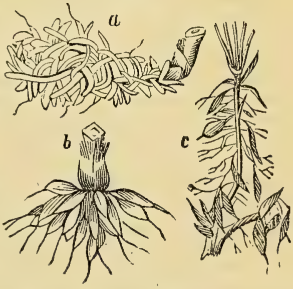
The *Granulated root* (Fig. 17) consists of little bulbs or *tubers*, strung together by a thread-like radicle, as in the common wood-sorrel. By some, this is called *moniliform*, from *monile*, a beaded necklace. The potato and other *tubers* are by late botanists classed as *subterranean stems*, capable of developing leaf-buds; these may consist of *one tuber;* as in the potato (Fig. 18, *a*); or of *many*, connected by filaments, as in the artichoke (*b*). These tubers are reservoirs of moisture, nourishment, and vital energy. The potato is an excrescence, proceeding from the real root. It is a singular fact that this nutritious substance is the product of a plant whose fruit is poisonous. The *eye* in the potato is a *bud.* The root of some of the orchis plants (Fig. 18, *c*) consists of two ovate tubers; these roots are said to be *tuberiferous.*

Fig. 18.



b. Fig. 19, at *a*, shows a root of the Spiranthes, one of the orchis tribe of plants. It bears a mass of crowded, club-shaped tubers: this is called a *grumose* root. At *b* is a *fasciulated* tuberous root, as in the dahlia, peonia, and asphodel. At *c*, the tubers are suspended from the caudex, as in the root of the *Spiræa filipendula.*

Fig. 19.

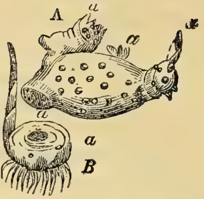


36. Bulbs.—These are subterranean leaf-buds covered with scales arising from a shortened axis. From the center of the bulb a shoot or herbaceous stem is produced, which dies down. New bulbs (called turions) are produced from the subterranean axis, formed like buds in the center of a scale. The new bulb sometimes remains attached to the parent bulb, and sends up an axis and leaves, sometimes forms an independent plant. The new bulb feeds on the parent one until it is wholly absorbed.

Granulated root—Tubers not the real root.—36. Bulbs.

Fig. 20, at A, shows a bulb crowded with *turions*, some of which, *a a*, are in a germinating state. At B is a bulb (crocus), showing the turions at *a a*, while at *b* appears one which is partially developed.

Fig. 20.

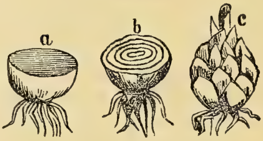


37. Bulbous plants belong chiefly to the great division of *Monocotyledonous* plants; they produce some of the earliest flowers of spring. Among them are the hyacinth, the crown-imperial, the lily, and the tulip. The use of the bulb being to preserve the young plant from the effect of cold, we see the bountiful agency of Providence in the number of bulbous plants in cold countries.

Small bulbs, called *bulblets*, grow upon the stems and branches of some plants, as in the tiger-lily and tree-onion; in the latter, the bulbs, or onions, grow upon the stalks, in clusters of four or five, continuing to enlarge until their weight brings them to the ground, where they take root; these bulblets are transformed buds.

The turnip at *a*, Fig. 21, has a bulbous, fleshy *caudex*, with fibrous roots; the onion, *b*, is a *tunicated*, the lily, *c*, a *scaly* bulb.

Fig. 21.



Some bulbs die after the blossoming of the plant; new bulbs are formed from the base or sides of the original ones, which, in their turn, produce plants. This is the fact with respect to the orchis tribe; in which every year one bulb or tuber dies, and the other throws out a new stem; by this means, it changes its position, though slowly, since it takes but one very short step each year.

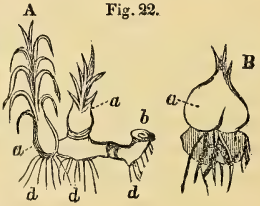
a. Gardeners take up bulbs as often as once in two or three years. In some plants the new bulbs are formed *beside* the old ones; thus they become crowded, and produce inferior flowers. In many kinds, as the tulip and narcissus, the new bulbs are formed *under* the old ones, and these become at length too deep in the earth; while the new bulbs of the crocus, gladiolus, and some other plants, grow *above* the old ones, and on account of being too near the surface, are liable to be injured by frosts and drought.

Fig. 22 shows at A, a root of Solomon's seal (*Convallaria*): *a a* are the young bulbs; *b* marks the spot from which the decayed stalk of the former year has fallen; *d d* are the fibers or *true root* of the plant.

At B is a root of the Ixia, or Blackberry-lily; *a* shows the young bulb formed above the parent one, which is withering in consequence of having imparted its vigor to its offspring.

What was formerly called a bulbous root, is now considered a *bulbiferous* or bulb-bearing root, since all that is truly a root is the fibrous part.

Fig. 22.



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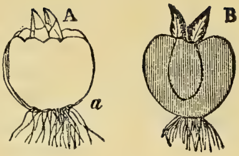
37. Bulbous plants.—*a.* Reasons for taking up bulbous plants.

Fig. 23.



At A, Fig. 23, *a* shows the disk or surface where the fibers are attached to the base of the bulb; this is the root-stalk. The bulb above, contains the leaves, stems, and flowers of the plant. B shows the same bulb cut vertically, to expose the embryo plant.

c. The production by bulbs, is only a continuation of the old plant, while by means of the seed, a new plant is brought forth. This is an important distinction; and it is observed that in process of time, a plant continued by means of reproduction, whether by bulbs, grafting, or any other manner, ultimately dwindles and degenerates as if worn out with old age, and it becomes necessary to renew its vigor by producing a young plant from the seed. This is the case with the potato; the farmer who finds his stock degenerating is obliged to provide himself with new tubers *produced from the seed.*

38. The specific character of plants is sometimes taken from the root, or tuber, and, in some cases, the specific name; as SOLANUM *tuberosum*, the potato, and RANUNCULUS *bulbosus.* The tuberiferous and bulbiferous roots distinguish those species from all others of the families Solanum and Ranunculus.

a. We find, on casting a rapid glance over the face of the earth, that variety in the form of roots is not without its peculiar use. Mountains being exposed to winds, are covered with plants which have branching roots with strong and woody fibers. These fastening themselves into the clefts of rocks, take firm hold, and the trees they support seem undauntedly to brave the violence of storms and tempests. Spindle roots abound in rich soft grounds, which they can easily penetrate. Damp and loose soils are rendered fit for the use of man, by being bound together by creeping and fibrous roots. We find here, as in every part of nature, proofs of a wise Creator, who makes naught

"In vain, or not for admirable ends."

39. There are some plants which are not fixed, but float about in the water; some grow upon other plants, and some derive sustenance from air alone. Of the first kind, or *Aquatic plants*, is the Lemna, or duckmeat, which grows in stagnant water, having thread-like roots, not confined to any fixed place. The water star-grass (*Callitriche aquatica*), previous to its blossoming, floats about, and is nourished by its suspended fibers; after flowering, it sinks to the bottom, its roots become fixed, and its seeds ripen. These seeds germinating, a new race of plants appear, which rise to the surface of the water, blossom, and sink to the earth, producing in turn their successors. Some of the Cryptogamous plants, particularly of the genus Fucus, exist in a wandering manner, often forming islands of considerable size. In the Gulf of Florida, the *Fucus natans* is very abundant; this, by voyagers, is often called gulf-weed, and is sometimes found in masses extending many miles, and,

"Sailing on ocean's foam,
Where'er the surge may sweep, the tempest's breath prevail."

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c. Difference between the continuation of plants by bulbs, &c., and by raising from the seed.—38. Specific character and name taken from the roots.—*a.* Utility in the variety of form in roots.—39. Aquatic plants.

How strikingly analogous this poor weed to many a human being, blown about on the ocean of life, by every breath of passion or caprice! Who would not rather, like the mountain oak, meet the storms of life firmly rooted in virtuous principles, than be floated along, even by the breath of pleasure, without end or aim, forgetful of the past, and careless of the future? To the virtuous, afflictions serve but to strengthen them in goodness; so,

> "Yonder oaks! superior to the power
> Of all the warring winds of heaven do rise,
> And from the stormy promontory tower;
> While each assailing blast increase of strength supplies."

We find some roots growing on plants, and deriving sustenance from their juices. These are called *parasites.* Parasitic plants are common in tropical regions; sometimes many kinds are found upon the same tree, presenting a curious variety of foliage. In our climate, except in the Cryptogamous family, as lichens, mosses, &c., we have but few genera of these plants.* The dodder and mistletoe are celebrated parasitic plants. The *Epiphytes* (from *epi*, upon, *phuton*, a plant) grow without roots; they are called *Aerial*, or *air plants;* their substance is usually fleshy and juicy; some of them flourish in the most dry and sandy places exposed to a burning sun; as the *Stapelia*, or *vegetable camel.* The *Epidendrum* grows and blossoms for years, suspended from the ceiling of a room, and nourished only by air. The Tillandsia, or black moss, so common in southern regions, belongs to this class of plants; its long, gray festoons draping the forests, as they extend from tree to tree, give them a peculiar appearance.

The growth of the root is most rapid in autumn; at this season, the sun being less powerful, and the air more charged with moisture, the juices condense in the lower part of the plant, and nourish it; but as the season becomes cold, vegetation is checked. The winter is the best time to collect roots for medicinal purposes, because their peculiar virtues are then most concentrated.

LECTURE VII.

STEM.

40. The Stem is the body of a plant; its use is to sustain the branches, leaves, and flowers, and to serve as an organ of com·

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* In the vicinity of Troy I have seen a very beautiful species of the *Pterospora*, growing upon a branch of the whortleberry; its color was a bright crimson, which contrasted beautifully with the white flowers and green leaves of the plant on which it grew.

Parasitic plants—Air plants.—*a.* Proper time to collect roots for medicinal purposes.—40. The Stem munication between them and the root, conducting to them the animal and vegetable substances, salts, and earthy matter, which the radicles by their spongioles imbibe for the nourishment of the plant. The influence of light and air, through the medium of the stem, is conveyed from the leaves to the root. Stems have a provision for a symmetrical arrangement of leaves and branches; *nodes* (from *nodus*, a knot), or points where leaf-buds are produced, being placed at regular intervals. No such provision occurs in roots, which branch out irregularly, according to the nature of the soil. The intervals between the nodes are called *internodes.* In the internodes, the fibers of the stem are parallel; but at the nodes, the inner fibers are sent off laterally to form leaf-stalks. The nodes have an intimate connection with the formation of all *leaves* and *buds;* they are the points from which these organs are developed. The stem in the embryo plant has its nodes, to the first of which the *cotyledons* are attached; at the next node above, we find the *primordial leaves.* The distance between the nodes determines the distance between the leaves; they may be so short as scarcely to be perceptible, or they may be wholly obliterated, or suppressed, and the leaves brought close together, in bunches, or arranged in whorls round the stem, or two may be situated on opposite sides of the stem. It is a general law in the arrangement of leaves and branches, that they are disposed *spirally*, in a line winding round the *stem* or *axis*, like the threads of a screw, though this arrangement is often interrupted by various causes.

41. All flowering plants have stems in some form or other. Those which have conspicuous stems are said to be *caulescent* (from *caulis*, a stem), as in trees, shrubs, and most annual plants. The *caulis* is either simple, as in the white lily; or branching, as in the geranium. We have, at Fig. 24, the representation of a *caulis*, or proper stem (*a*), a *peduncle*, or flower-stalk (*b*), and a *petiole*, or leaf-stalk (*c*). *Culm*, or straw (Fig. 25), is the stem of grasses and rushes. The culm is either *without knots*, as in the bulrush, *jointed* or *knotted*, as in Indian corn, *geniculated*, or bent like an elbow, as in some of the grasses. The bamboo, sugar-cane, and various species of reeds, have stems of the culm kind; some of them, particularly the bamboo, are known to attain the hight of forty feet. *Scape* (Fig 26, *a a*) is a stalk springing from the root, which bears the

Fig. 24.

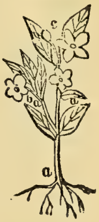

Fig. 25.

Nodes and internodes—General rule in the arrangement of leaves.—41. Division of stems—Caulis—Culm—Scape.

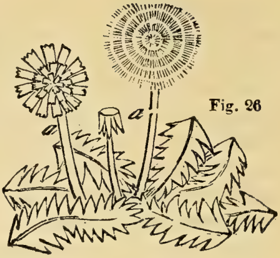

Fig. 26

flower and fruit, but not the leaves; as the dandelion. Plants with scapes are sometimes called *stemless plants* in which case, the scape is considered as a peduncle proceeding from the root.

a. Peduncle, or flower-stalk, is but a subdivision of the caulis or stem; it bears the flower and fruit, but not the leaves; when the peduncle is divided, each subdivision is called a *pedicel.* In determining the species of plants, the length of the peduncle is often compared with the flower. When there is no peduncle or flower stalk, the flowers are said to be *sessile.*

b. Petiole, or leaf-stalk, is a stem supporting the leaf, as the *peduncle* supports the flower; it is usually green, and is a part of the leaf itself. The petiole of many plants is somewhat in the form of a cylinder; the upper surface is rather flattened, the under surface convex. The *woody vascular tissue* runs through the petiole as threads or fibers bundled together, but are ramified in the leaf as veins. In most cases, the leaves and flowers are supported by distinct foot-stalks, but sometimes the foot-stalk supports both the leaf and flower. The petiole is often compared with the leaf, as the peduncle is with the flower, as to its relative length in the different species of plants.

c. The term *frond* belongs entirely to Cryptogamous plants; it is, however, applied to the leaf, rather than the stem; the leafy part of the fern (Fig. 27, *a*) is the frond; this bears the flower and fruit. Linnæus considered the leaves of palm-trees as fronds. The stem of the fern (Fig. 27, *b*) is called a *stipe.* By observations of geologists it is ascertained that *stiped* plants were created before *cauline* ones; petrifactions of the former being found in the lower formations of the earth, while no remains of cauline plants are found there. The stalk of a fungus or mushroom is called a *stipe.* The term is also applied to the slender thread which, in many of the compound flowers, elevates the hairy crown with which the seeds are furnished, and connects it with the seed. Thus, in a seed of the dandelion, the column (Fig. 28, *a*) standing on the seed (*b*) and elevat-

Fig. 27.

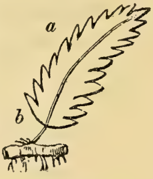

Fig. 28.

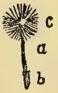

Fig. 29.

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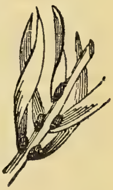
a. Peduncle—*b.* Petiole—*c.* Frond—Which part of the fern is its frond?—Which the stipe?—Difference between striped and cauline plants—Which first formed?—Different applications of the term stipe—Stipe of a dandelion seed—Stipe of a mushroom.

ing the down (*c*), is the stipe. At Fig. 29 is a mushroom with the cap (*d*) elevated on its stipe (*e*).

42. BRANCHES spring from *lateral* or *axillary buds.* The axillary bud is at first a minute point of cellular tissue on the surface of the wood, at the end of one of the lines that form the *medullary* rays (called silver grain). As it grows, the bud pushes through the bark, and appears as a rudimentary axis, which in time becomes a *branch.* Other buds are formed in like manner, and develop themselves from the branch at first formed, and so on through the whole system of the plant, as in a large tree. The smaller branches are called *twigs*, *boughs*, or *branchlets.* The branch may be considered as a tree, implanted upon another tree of the same species. Branches sometimes grow without any apparent order, the symmetrical arrangement of nature having been interrupted by disturbing causes; sometimes they are *opposite;* sometimes *alternate;* and sometimes, as in the pine, they form a *series of rings* around the trunk. Some branches are *erect*, as in the poplar, others *pendent*, as in the willow, and some, as in the oak, form nearly a right angle with the trunk. These various circumstances constitute distinctive characters in plants, a knowledge of which is very necessary to the painter. Of all our forest trees, perhaps none, in the disposition of its branches, presents a more beautiful and graceful aspect than the elm. The branches of trees, as they grow older, usually form a more open angle with the trunk than at first.

Fig. 30.



43. Of stems bearing *bulblets* in the axis of their leaves, the Lilium *bulbiferum*, or tiger-lily (Fig. 30), is a good example. These little bulbs are of a red-brown color, about the size of a large gooseberry. They begin soon after they are formed to detach themselves from the plant, and falling upon the ground shoot out fibers, and take root. This splendid flower may thus be rapidly increased. *Subterranean* stems, or those which grow under ground, are often called roots, but are distinguished by their producing leaf-buds at intervals. The term *rhizoma* is applied to stems creeping horizontally, being partially covered by the soil, sending out roots from its lower, and leaf-buds from its upper side, as in the Iris, some of the lily roots, and in some of the orchis plants (see Fig. 19, *a*), the Solomon's seal (Fig. 22, A), and the Ixia (Fig. 22, B).

A *soboles* is a creeping, underground stem, sending roots from one part, and leaves from another. It is often called a

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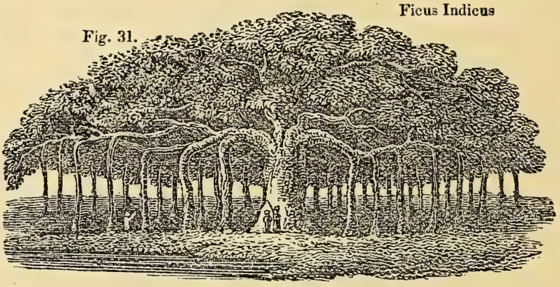
42. Branches—Branchlets—Various appearances of branches—Branches alter in their angles as they grow older.—43. Bulb-bearing stems—Rooting stems.

creeping root (see Fig. 16). A tuber is by modern botanists considered as a thickened stem produced by the approximation of the nodes, and the swelling of the internodes, as in the potato. The ordinary herbaceous stems of the potato, when cut into slips and planted, sometimes form branches from its base, which assume the form of tubers. A *corm* is a solid, underground stem which does not spread by sending out shoots, but remains of a rounded form, and is covered with thin scales on the outside. It is distinguished from a root by sending off annually buds, or thickened branches, either from the apex or side. These buds feed on the original corm, and destroy it.

The *runner* is a slender, prostrate stem sent off from the base of the parent stem, capable of forming a new plant, as the runners of the strawberry. A *sucker* is an erect branch from the subterranean part of the stem, which first produces leaves, and afterward roots, as the rose. A *stolon* is a branch from the lower part of a stem, which falls to the ground and takes root. An *offset* is a short prostrate branch terminated by a tuft of leaves and capable of taking root, as the house-leek.

44. A remarkable phenomenon is described by travelers, as exhibited by the stems of the Banyan-tree of India (*Ficus Indicus*); *these stems throw out fibers which descend and take root in the earth.* In process of time they become large trees; and thus from one primitive root is formed a little forest. This tree is called by various names; as the Indian-God-tree, the arched-Fig-tree, &c. The Hindoos plant it near their temples, and in many cases, the tree itself serves them for a temple. Milton speaks of this tree, as the one from which Adam and Eve obtained leaves to form themselves garments; he says it was not the fig-tree renowned for fruit, but

Fig. 31.


Ficus Indicus

> "Such as at this day to Indians known
> In Malabar or Decan, spreads her arms,
> Branching so broad and long, that in the ground
> The bended twigs take root, and daughters grow
> About the mother tree, a pillar'd shade
> High overarched, and echoing walks between."

This wonderful tree (Fig. 31) is said to be capable of giving shelter to several thousand persons.

45. All varieties of stems belong to two classes: 1st, such as grow *externally*, having their wood arranged in concentric layers, the oldest being in the center of the trunk, and the newest forming the outer layer; as may be seen in the oak,

44. Banyan-tree.—45. Dicotyledonous stems.

and other forest trees in our climate, and also in most of our common herbaceous plants: they are called *Exogenous* stems, signifying to grow outwardly; plants with such stems spring from seeds with *two cotyledons*, and are therefore called *dicotyledonous* plants. Stems which grow *internally*, as palms and grasses, are called *Endogenous*, signifying to grow inwardly; the wood, instead of circling around the first formed substance, is pushed outward by the development of new fibers in the center; this kind of stem is peculiar to plants whose seeds have but *one cotyledon*, and are therefore called *monocotyledonous.*

LECTURE VIII.

BUDS.

46. A BUD is a protuberance formed by a new shoot. The *normal* situation of the bud is at the nodes, and it usually appears at the axil of the leaf. In the embryo is a short axis or stem crowned by two or more undeveloped leaves, *or a bud.* The apex of a growing stem is always crowned with the rudiments of a new plant, or with a *bud.* The scales of buds usually envelop each other closely; the exterior ones being dry and hard, the interior moist, and covered with down; they are also furnished with a kind of resin, or balsam, which prevents the embryo from being injured by too much moisture. Buds have been known to lie for years in water, without injury to the germ within. The sap is the great fountain of vegetable life; by its agency new buds are yearly formed to replace the leaves and flowers destroyed by the severity of winter.

If we plant a slip of Geranium, it either sprouts from the axil of a leaf, or from knots in the stem, which answer the same purpose as the leaf, by slightly interrupting the circulation of the juices, and thus affording an accumulation of sap necessary for the production of a new shoot. The different periods of the bud have been distinguished as follows: the point or nucleus which first appears, is called the *eye;* when this begins to swell so as to be apparent, it is termed the *button;* and in a more mature state the *bud.* Herbs and shrubs have buds, but these usually grow and unfold themselves in the same season, and are destitute of scales; while the buds of trees are not perfected in less than two seasons, and, in some cases, they require years for their full development.

a. Nature is bounteous in her provisions, and lays in a large stock of these rudiments of future plants, so that when some fail of maturing, others are always ready to take their places. In the spring, the growth of the leaves and branches of trees is rapid; but as summer advances, the progress of vegetation seems almost suspended. Yet nature, instead of resting in her operations, is now busy in pro-

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Monocotyledonous stems.—46. Bud—Its normal situation—Bud in the embryo—In a growing stem—Scales of buds—Agency of sap—The eye, button, and bud—Herbs and shrubs destitute of scaly buds *a.* Period in which the formation of buds commences.

viding for the next year; she is turning the vital energies of the plants to the formation of buds. Those little embryo plants, so nicely wrapped up in downy scales as to be able to bear the coldness of winter, in the ensuing spring will come forth from their snug retreats, and taking the places of the leaves which had withered in autumn, delight us with new verdure and beauty.

b. De Candolle supposes that in the latter part of summer, the *eye* is formed, and the young shoot forces its way through the bark; but the young leaves which would put forth, becoming chilled by the ungenial atmosphere of the coming winter, contract and harden, and at length form scales; and that these scales afterward protect the new leaves, which, urged by the same vegetable instinct, are, in their turn, seeking to emerge into light and air. If we admit this explanation with respect to the formation of scales, it seems not difficult to account for the covering of varnish, which defends the embryo leaves and flowers from moisture. When the leaf becomes a scale, it then absorbs from the sap but a portion of what was destined for its use, and the remaining sap may be converted into the resinous substance, or varnish. With respect to the downy coat upon the inside of the scales, this may be seen in the rudiments of the leaves, if examined before the bud is developed. These hypotheses do not, in any degree, derogate from the wisdom of Him who, "with art inimitable, folds up the tender germ;" for whether He act by secondary causes, or "speak, and it is done," design is alike apparent in all his works.

c. The term bud, in common language, extends to the *rudiments* of all plants, whether with scales or without, which originate upon other living plants. Buds with scales are chiefly confined to the trees of cold countries. In the northern part of the United States, there are few trees which can endure the cold weather, without this security. In Sweden, it is said, there is but one shrub* destitute of buds, and this, from the peculiarity of its situation, is always protected from the inclemencies of weather. It is said that no perennial plants but those furnished with scaly buds can live in climates where it snows a part of the year. Trees of the torrid zone, whose wood appears hard and firm, perish in our latitude. In warm climates, the buds of the trees are without scales, the tender shoots not requiring their protection. That there is, in reality, a difference in the constitution of vegetables, as well as animals, is very apparent; an orange-tree forms no scales to protect its buds from cold; nor can the delicate tropical animals resist the rigors of a polar climate. There are cases, however, in which both plants and animals change their habits. The horse-chestnut, in India, its native climate, unfolds its leaves to the atmosphere, without any check to their development; in a colder climate, the leaves, in attempting to unfold, being checked in their progress, degenerate into scales and form buds.

Fig 32.

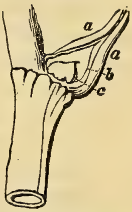

Fig. 33.

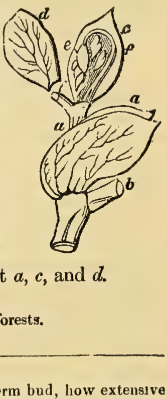

Figure 32 shows a branch of the buttonwood-tree (*Platanus*), in which the bud is formed within the petiole of the preceding year; this performs the office of the scaly covering in other buds; *a* is the lower part of the petiole cut vertically to show the cavity *b*, in which is contained the bud *c*.

Fig. 33 represents a young branch of the tulip-tree (*Liriodendrum*): *a a* are scales which covered the bud, now two stipules, cauline, and oval; *b* is part of the petiole of the leaf; *c*, another envelope of the bud, from which is detached the envelope *d*, in order to show the situation of the leaves *e*, and the buds *f*. The buds *f* are each furnished with a scaly envelope like those seen at *a*, *c*, and *d*.

* A species of *Rhamnus* which grows under trees, in marshy forests.

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b. Opinion of De Candolle with respect to the scaly covering of buds—The term bud, how extensive in its application—*c.* Scaly buds chiefly confined to cold countries—Difference in the nature of vegetables—They sometimes change their habits; example, the horse-chestnut—Explain Fig. 32—Explain Fig. 33.

47. Monocotyledonous plants seldom produce more than one bud annually. On the summit of the palm appears the bud, containing the leaves and flowers; from the center of this bud, a foot-stalk springs up bearing the flower, while the leaves spread out at its base. The following year the old leaves decay, forming, by their indurated remains, a ring around the stipe of the palm; and a new bud is formed upon its summit as before. The bud of the palm, from its form and size, is often called the *cabbage*. Leaf-buds are either *aerial* or *subterranean*. In the asparagus, which has a perennial stem below ground (a *rhizoma*), *subterranean buds* are annually produced, which appear above ground as buds covered with scales; this bud is a *turion*. These branches are herbaceous, and perish annually, while the true stem remains below ground, ready to send up new shoots. The lily and onion are subterranean buds.

a. Botanists enumerate four kinds of buds, the *bulb*, *turion*, *bulblet*, *bulbille*, and the *proper bud*.

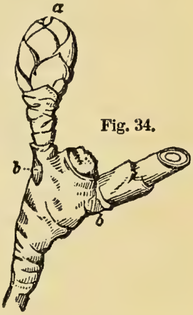

Fig. 34.

48. The proper *bud* consists of the *flower-bud*, the *leaf-bud*, and the *mixed-bud*.

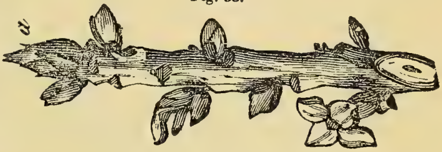

Fig. 35.

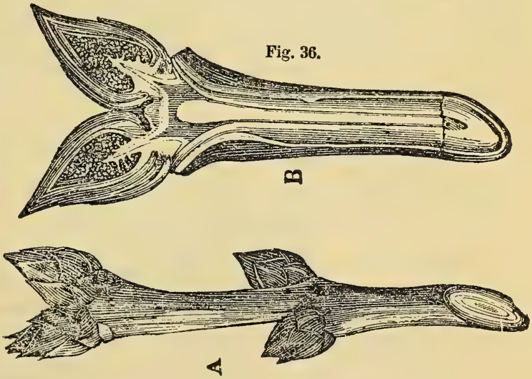

Fig. 36.

a. The flower-bud is of a short, round form, and contains the rudiments of one or several flowers, without leaves, folded over each and surrounded with scales. The *leaf-bud* contains the rudiments of several *leaves without flowers*; it is usually longer and more pointed than the flower-bud. The *mixed-bud* contains *both leaves and flowers*.

Fig. 34 shows, at *a*, the flower-bud of the apple with its scaly covering; *b*, the spot occupied by the buds of the preceding year. The flower-bud is usually found at the extremities of small short branches;

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47. Bud of the palm *a.* What four kinds of buds?—48. Proper bud, how many kinds?—Fig. 34, flower-bud.

it is employed in grafting or inoculating, which is performed by cutting into the bark of another tree, and placing a bud in the aperture. The sap from the tree soon begins to stimulate the bud; in time it puts forth leaves and branches, and bears fruit peculiar to the tree from whence it was taken. Fig. 35 shows a branch of the *Daphne mezereum;* the terminal bud at *a* is a *leaf-bud*, while the lateral buds are *flower-bearing* ones. We see at Fig. 36, A, a branch of the lilac (*Syringa vulgaris*), bearing the *mixed buds;* they are opposite, and covered with a scaly envelope. B is the same cut vertically in order to show the thyrse of flowers formed in the buds in autumn.*

b. Leaf-buds, if taken from the tree and planted in the earth, will grow, and put forth roots; but flower-buds in the same situation will perish. A striking analogy exists between buds and seeds, as between buds and roots. When buds make their appearance from any other part than the *nodes*, they are termed *adventitious*, irregular or *abnormal* buds. Such irregularities sometimes appear upon the roots, and even the margin of leaves.

c. We have now seen the manner in which buds commence their existence, and how they gradually unfold themselves, until they become in their turn branches covered with leaves and flowers. In considering this subject, we are impressed with a sense of the goodness of that great Being who watches with unceasing care over his vast creation. A bud lives, an infant lives; both are destined to grow, and to pass through physical changes: but the bud, although active with a principle of life, knows not its own existence; while the infant becomes conscious of its own powers and faculties, capable of loving those who have contributed to its well-being, and especially of adoring the great Author of its existence. It is delightful, while gratifying our love of knowledge, by inquiring into the economy of nature, to be met at every step with new proofs of the goodness and wisdom of its great Author. To discover the character of the Deity, should indeed be the end and aim of all knowledge; and should an occasional digression from our subject retard our botanical investigations, the loss would be slight compared to the gain of one pious sentiment or devout aspiration. When we become so deeply engaged in philosophical speculations, as to forget Him whose works we study, we wander from the path of true knowledge. It was not thus that Newton studied the laws of matter, Locke and Watts the laws of mind, and Paley the animal and vegetable physiology; these great and good men made their rich treasures of knowledge subservient to one great design—that of learning the character of God and their duty to Him, and of instructing their fellow-men in the sublime and important truths communicated in Divine revelation.

LECTURE IX.

LEAVES.

49. The term *phyllotaxis* signifies *leaf-arrangement.* Leaves arise from the nodes of the stem, and new buds are formed in

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* I have this day, November 24, 1828, examined the buds of a vigorous lilac, and find, on cutting one vertically, the thyrse of flowers very apparent to the naked eye, and of nearly the size represented in the cut.

Fig. 35, leaf-bud—Fig. 36, mixed-bud—*b.* Analogies—Adventitious buds—*c.* Reflections—Comparison—Difference—The goodness of God particularly manifested towards the human race—Philosophical speculations should not lead us to forget the Author of nature.—49. Phyllotaxis.

the axils of leaves. One leaf only arises from the same organic point; a *tuft* or *fascicle* of leaves is composed of the leaves of an axillary branch so short that the bases of the leaves are in contact; that is, the foliage develops without any elongation of the axis or the internodes. The complete leaf consists of the *lamina* (*blade or limb*), its *petiole* and pair of *stipules* at its base. Sometimes there is little expansion of this organ, but it is *stalk-like*;—generally the leaf is expanded horizontally, so as to present the under surface to the ground, the upper to the sky. On examining the cellular texture with a microscope, it is found that there is in each leaf an upper and an under stratum of differently arranged cells; the upper stratum has its cells compact, and so arranged as to be least affected by the direct rays of the sun, while the under stratum has a cellular arragement more favorable for evaporation or exhalation.

50. The leaf is an expansion of the fibers of the bark, connected by *cellular tissue*, developed in a symmetrical manner, as lateral appendages to the stem, and having a connection with its internal part. It is covered with a green coat, or skin, called the *cuticle*. Leaves are furnished with pores called *stomata*, for exhaling and inhaling gases. They present to the air a more extended surface than all the other vegetable organs, and are of great importance to the vitality of the plant, by imbibing suitable nourishment, and throwing off such gases as would be useless or injurious. In other words, leaves are organs of *digestion* and *respiration*.

a. We have seen how the bud is formed, and by what wise means the principle of life which it contains is protected through the cold and dampness of winter. In the spring, when the sun having recrossed the equator is advancing toward our hemisphere, the vegetable world quickened by its influence begins to awaken from a dormant state, the buds expand, and bursting their envelopes, the new branches bearing leaves and flowers come forth.

51. The arrangement of the leaf in the bud is called *vernation* (*ver*, spring), *prefoliation* (*præ*, before), and *gemmation* (*gemma*, a bud); it differs in different species, but in each follows a regular law.

Fig. 37.

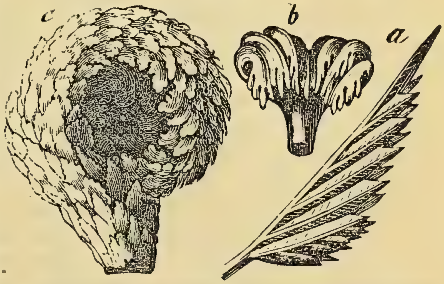

Figure 37, at *a*, shows a young leaf of the currant; this is *folded*. At *b*, is a young leaf of the monk's hood; this is *inflected*. At *c*, is the young leaf of a fern (*Aspidium*); this is *circinate*, or rolled from the summit toward the base.

Origin of leaves—Complete leaf—Different strata of the leaf.—50. Structure of the leaf—Utility of leaves to the plant—*a*. Expanding of the bud.—51. Arrangement of the leaf in the bud, Fig. 37.

b. Some plants are destitute of leaves; they are then called *Aphyllous*, from the Greek *a*, to want, *phyllon*, a leaf.

c. Specific names are often given from some circumstance of the leaf: the HEPATICA *triloba* is that species of the Hepatica which has leaves with three divisions, called *lobes.* The VIOLA *rotundifolia*, is a species of violet with round leaves. A knowledge of the various appearances presented by leaves is of great importance to the botanical student; in order to become acquainted with these, much practice in the analysis of plants is necessary. Engravings will assist the pupil in understanding definitions, but Nature should ever be consulted when practicable.

52. The new plant is called a *phyton;* in its simplest form it consists of two leaves and a bud, which is the axis, and forms the stem and root. *Seminal* leaves first appear above the surface of the earth, as in the garden bean; these leaves are the cotyledons, which, after nourishing the phyton, decay. *Primordial* leaves appear in the axils of the seminal leaves, and resemble them in position, form, and size. The primordial leaf, according to the fanciful idea of a French botanist, is a sketch which nature makes before the perfection of her work. *Characteristic* leaves are found in the mature state of the plant. According to the idea above advanced, nature here perfects her design. It is not always, however, that this process, with regard to change of leaves, takes place; as in many cases, the proper, or characteristic leaf, is the only one which appears.

53. VENATION OF LEAVES.—The expanded part of the leaf is called the *lamina* or blade; the end of the blade next the stem is the *base*, the opposite end the *apex.* The *parenchyma* is the cellular tissue which composes the body of the leaf, or the filling of a frame-work or skeleton composed of *vascular tissue.* The bundle of vessels which compose this frame-work are called *veins*, sometimes *ribs* and *nerves.* The *midrib* is the principal vein which passes from the leaf-stalk through the center of the leaf; its branches are *primary* veins, which, when subdivided, are called *secondary* veins, and a still more minute division, *veinlets.* The distribution of veins in the leaves is called *venation*, sometimes *nervation.* In succulent plants the veins are sometimes obscure; these are called *hidden-veined.* Leaves may be divided into *three* great classes according to their venation. *Reticulate* or *netted* leaves, in which the petiole is prolonged into the leaf in the corm of the midrib, and there is an angular net-work of vessels, as occurs in the leaves of exogenous plants, as the oak, rose, &c. *Parallel-veined*, in which the veins run in a straight or curved manner from base to apex, or from the midrib to the margin of the leaf, and are connected by simple transverse veins, as appears in most endogenous or monocotyledonous plants, as the lily, grasses, &c. *Forked-veined*, when the veins divide and subdivide by forked divi-

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b. Aphyllous plants—*c.* Leaves furnish specific characters.—52. Leaves with respect to succession—53. Venation of leaves—Reticulate-veined—Parallel-veined—Forked-veined—Feather, and radiate veined ions, which do not again unite, as in the cryptogamous plants, of which the fern is an example. *Reticulate-veined* leaves are divided into the *feather-veined*, as the chestnut, and *radiate-veined*, as the maple.

54. Form of Leaves.—Leaves are *simple* or *compound.* A *simple* leaf is when the lamina consists of a single piece. A *compound* leaf consists of several parts, each of which is articulated with the common petiole, in the same manner as the latter is connected with the stem. The parts of a compound leaf are *leaflets*, or *folioles.* The shape and outline of leaves are found to depend chiefly upon the arrangement of the framework or vascular portion. The form of leaves is expressed by terms borrowed from the names of different objects; as *palmate*, hand-shaped; *digitate*, from digitus, the finger, &c.

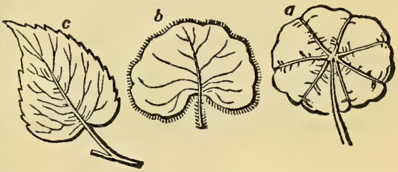


Fig. 38.

Of *simple leaves* there are as follows: *a. Orbicular*, or the round leaf,—as in the Nasturtion (See Fig. 38, *a*); this is also *peltate*, having its petiole inserted into the center of the leaf, and thus resembling a shield. It is radiately-veined, and reticulate.

b. Reniform (from the Latin *ren*, the kidney), or, as it is sometimes called, *kidney-form;* the ground-ivy (*Glechoma*) has a leaf of this kind (See Fig. 38, *b*); it is *crenate*, or has a margin with scalloped divisions; *ciliate*, being fringed with hairs, like eyelashes. The venation is radiate and reticulate.

c. Cordate (from *cor*, the heart), or *heart-shaped.* Fig. 38, *c*, represents a cordate leaf with an *acuminated* point, that is, acute and turned to one side; the margin is *serrated*, or notched like the teeth of a saw; this kind of leaf may be seen in the *Aster cordifolium*, or aster with a heart-shaped leaf. Some of the lower leaves are curved backward, and then upward

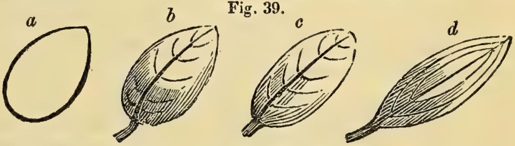
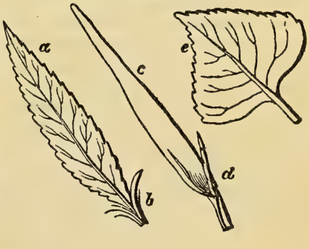


Fig. 39.

d. Ovate, obovate, oval; these are terms derived from the Latin *ovum*, an egg. Suppose the figure at 39, *a*, to represent an egg; if to the broad end we add a petiole, prolonging it into a mid-rib with some lateral divisions, we have, as at *b*, the representation of an *ovate* leaf. If the petiole were placed at the narrowest end, it would be an *obovate* leaf. An *oval* leaf (*c*), is when both the ends are of equal breadth. When the length is much greater than the breadth, the leaf is said to be *elliptical*, as at *d.* In the ovate leaf, the veins *next the base* are longest; in the obovate leaf, those at *the apex* are longest; in the elliptical leaf they are curved; thus the outline of the leaf varies according to the mode and degree of the spreading of the veins.

Fig. 40.


e. Lanceolate (Fig. 40, *a*): this kind of leaf may be seen in the peach-tree; it is *acuminate*,

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54. Forms of leaves—*a.* Orbicular—*b.* Reniform—*c.* Cordate- *d.* Ovate—Obovate—Oval—Elliptical,

with a *serrulated* or slightly notched margin; at *b*, may be seen the cleft *stipules* or appendages of the leaf.

f. Linear, as the grasses and Indian corn (Fig. 40, *e*); this leaf is *sheathing*, or incloses the stem by its base, as may be seen at *d*. Here the veins do not spread out, but run from the base to the apex with a narrow strip of parenchyma.

g. Deltoid, from the Greek letter *delta*, Δ; the Lombardy poplar, *e*, affords an example of the same.

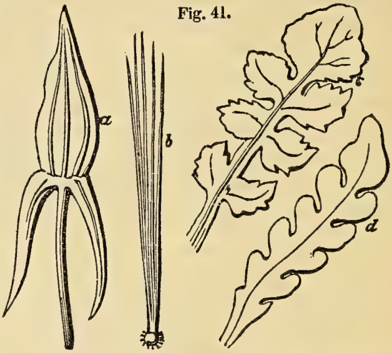
Fig. 41.

h. Sagittate (from *sagitta*, an arrow, Fig. 41, *a*); the *Sagittaria*, an aquatic plant, affords an example of this leaf. The acute lobes are prolonged downward.

i. Acerose, or needle-shaped (Fig. 41, *b*). Leaves of this kind are mostly clustered together, as in the pine; they are *subulate, rigid* and *evergreen.* Trees with acerose leaves are usually natives of mountainous or northern regions; any other kind of leaves would, in these situations, be overpowered by the weight of snow, or the violence of tempests; but these admit the snow and wind through their interstices. Their many points and edges, presented even to a gentle breeze, produce a deep solemn murmur in the forest; and when the storm is abroad and the tempest high,

> "The loud wind through the forest wakes,
> With sound like ocean's roaring, wild and deep,
> And in yon gloomy pines strange music makes."

Burns, in describing such a scene, says: "This is my best season for devotion: my mind is wrapt up in a kind of enthusiasm to Him who 'walketh on the wings of the wind.'"

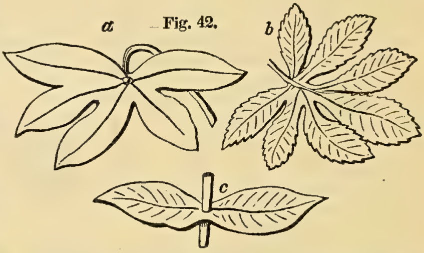
Fig. 42.

j. Pinnatifid (Fig. 41, *d*); this is a feather-veined leaf; when finely divided like the teeth of a comb, such leaves are said to be *pectinate.*

k. Lyrate (Fig. 41, *c*) differs from pinnatifid in having its terminating segment broader and more circular.

l. Palmate, or hand-shaped (Fig. 42, *a*); as in one species of the passion-flower (*Passiflora cœrulea.* The oblong segments like fingers arise from a space near the petiole, which may be considered as analogous to the palm of the hand.

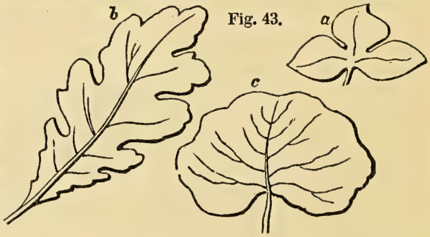
Fig. 43.

m. Digitate, or fingered leaf (Fig. 42, *b*), differs from the palmate in having no space resembling the palm of a hand; but several distinct leaflets arise immediately from the petiole, as may be seen in the horse-chestnut.

n. Connate (Fig. 42, *c*), when the bases of opposite leaves are so united as to appear one entire leaf.

o. Lobed is when leaves are

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e. Lanceolate—*f.* Linear—*g.* Deltoid—*h.* Sagittate—*i.* Acerose —*j* Pinnatifid —*k.* Lyrate—*l* Palmate—*m.* Digitate—*n.* Connate—*o.* Lobed.

deeply indented at their margins; and according to the number of these indentations, they are said to be *three-lobed, four-lobed,* &c. Fig. 43, *a*, represents a three lobed leaf, as may be seen in the *Hepatica triloba.*

p. Sinuate (from *sinus*, a bay) is applied to leaves which have their margins indented with deep, roundish divisions, as the leaf at *b*, Fig. 43.

q. Emarginate, denotes a slighter indentation, as the leaf at *c*, Fig. 43.

r. Flabelliform, or fan-shaped (from *flabellum*, a fan), is seen in some of the palms. In China they are used for fans, and sold to foreign merchants for the same purpose. Fig. 44 is a representation of the dwarf fan-palm.

s. Stellated, or whorled (from *stella*, a star), is applied both to leaves and flowers, and relates to the manner in which they grow around the stem, as in Fig 45.

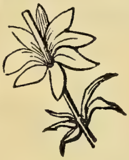

Fig. 45.

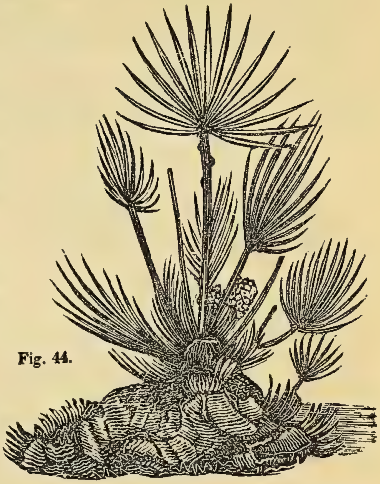

Fig. 44.

t. Tubular; as in the leaf of the onion.

The Sarracenia, or side-saddle flower, has the sides of its leaf united, forming a cup, which is found filled with liquid, supposed to be a secretion from the vessels of the plant. In some countries of the torrid zone, is the wild pine, or black moss (*Tillandsia*), the leaves of which are hollowed out at their base, so as to be capable of containing more than a pint of fluid. A traveler says, "By making an incision into the base of this leaf, and collecting in our hats the water which it contained, we could obtain a sufficient supply for the relief of the most intense thirst." This water is not a secretion from the plant, but is deposited during the rainy season. The pitcher-plant (*Nepenthes distillatoria,* Fig. 46), affords a most singular tubular appendage to its lanceolate leaf; beyond the apex of the leaf *a*, the mid-rib extends in the form of a tendril, which is inflated into a hollow bend forming the cup or pitcher *b*, about six inches in length and one and a half in diameter; it is furnished with a ligament like a lid, *c*, which expands and contracts according to the state of the atmosphere, so that the cup is open in damp weather to receive moisture from the air, and closed in dry weather to prevent its evaporation. It usually contains about half a pint of pure water. A small species of shrimp lives by feeding on the insects which collect in this cup. The pitcher-plant is a native of Ceylon, where the monkeys frequent it for quenching their thirst; it has for this reason been called *monkey-cup.*

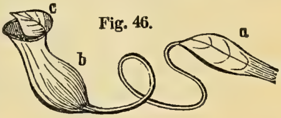

Fig. 46.

55. Compound Leaves.—When several leaflets grow on one petiole, the whole is termed a *compound leaf*, as in the rose, Fig. 47. The fall of *compound leaves* is caused by the separation of the common petiole from the main stem. The *number* and *arrangement* of the leaflets depend upon the venation. The

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p. Sinuate—*q.* Emarginate—*r.* Flabelliform—*s.* Stellated—*t.* Tubular.—55. Compound leaves.

divisions extend to the midrib or petiole; this has the appearance of a branch with separate leaves attached to it. The whole is considered as one leaf, because in its earliest state it arises from the axis of a single piece; and its subsequent divisions in the form of leaflets, are all in one plane.

a. Pinnate (from *pinna*, a wing): Fig. 47, *a*, represents the petiole, or principal leaf-stalk, bearing leaflets arranged opposite to each other; these may be either petioled or sessile; *b b* represent the stipules; the whole taken together forms one compound pinnate leaf. *Binate;* when two leaflets only spring from the petiole, as in Fig. 47, *c*. *Ternate;* when three leaflets arise from the petiole, as Fig. 48, *a*. *Biternate* is a second division of threes, as Fig. 48, *b*. *Triternate* is a third division of threes, as Fig. 48, *c*. *Decompound*, when a pinnate leaf is again divided, or has its leaves twice compound, as Fig. 49, *a*. At *b* is a representation of *tricompound* leaves.

Fig. 47.

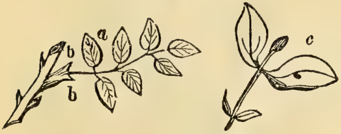
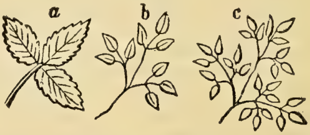


Fig. 48.



56. *Various appearances of Leaves.*—Compound leaves are confined to Exogenous plants, and are reticulated, or net-veined. Parallel-veined leaves, though divided, are never jointed; therefore, in Endogenous plants, there are no compound leaves.

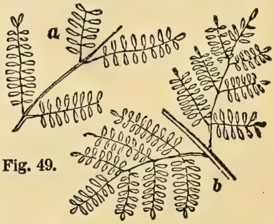


Fig. 49.

Fig. 50, at *a*, is a leaf of the *Ilex aquifolium* (holly); it is *oval* and *dentate*, with *spinescent* teeth.

b is a leaf of the *Malva-crispa* (mallows); it is *seven-lobed, crisped*, or irregularly platted, and finely *crenulate; venation, radiate.*

c is a leaf of the *Hydroeotyle tridentata;* it is *cuneiform, dentate* at the summit.

d is a leaf of the *Corchorus japonicus;* it is *oval-acuminate*, doubly *denticulate*

Fig. 50.

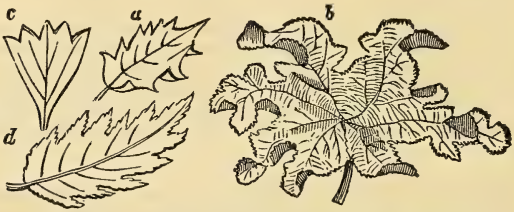


Fig. 51, *a*, is a *flabelliform* or fan-shaped leaf, *two-lobed*, and ***crenulate.***

b is *oval-acuminate, five-ribbed, ribs converging.*

c is *sub-cordate, oval-acuminate, undulate.*

Pinnate—Binate—Ternate—Biternate—Triternate—Decompound.—56. No compound leaves in Endogenous plants.—Explain figures 49, 50.

Fig. 51.

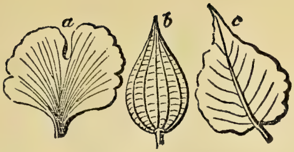


Fig. 52.

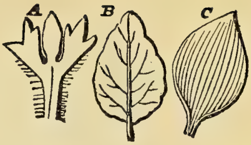


Fig. 52, *A*, is *flabelliform, five-parted, ciliate.*

B is *elliptical, retuse, mucronate.*

C, a leaf of the common plantain; it is *ovate, acute, many-nerved, not reticulatea.*

Fig. 53, *a*, *Menispermum canadense;* it is *sub-orbicular, three-lobed, peltate.*

b, *Passiflora biflora;* it is *two-lobed;* the lobes are *divergent.*

c, *Passiflora incarnata;* it is *three-parted;* the divisions are *lanceolate, denticulate;* the petiole *glandular.*

Fig. 53.

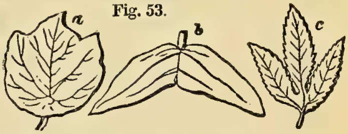


Fig. 54, *a*, is *seven-lobed, denticulate, peltate, radiate-veined.*

b, *Passiflora serrata;* it is *seven-lobed;* the divisions are *lanceolate, denticulate, glandular.*

c, *Alchemilla hybrida;* it is *nine-lobed, denticulate, plicate.*

Fig. 54.

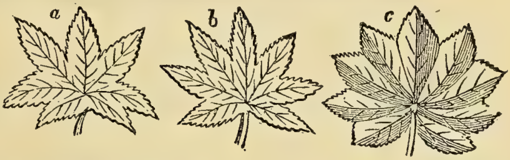


Fig. 55, *a*, *Jatropha multifida;* it is *many-parted;* the divisions are *pinnatifid.*

b, *Helleborus niger;* the leaflets are *sub-petioled,* mostly *acuminate, denticulate, radiate-veined.*

Fig. 56, *a*, *Pæonia officinalis;* it is *three-parted, decompound.*

b, *Geranium pratense;* it is *seven-parted, laciniate.*

c, *Leontodon taraxacum* (dandelion); it is *runcinate;* the divisions *triangular pointed toward the base; feather-veined.*

Fig. 55.

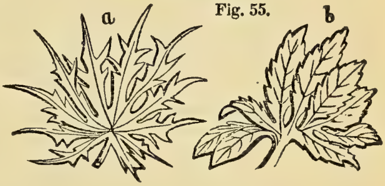


Fig. 56.

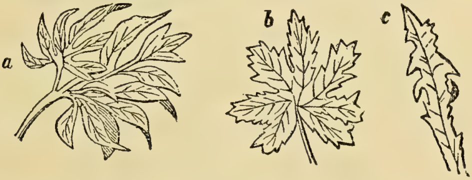
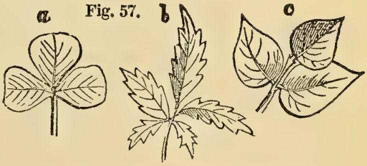


Fig. 57, *a*, a *trifoliate* or *ternate* leaf; the leaflets are *ob-cordate, entire.*

b is *digitate, five-leaved;* the leaflets are *lanceolate, denticulate.*

c has the petioles *stipuled* and *jointed (articulated);* the leaflets are *oval* and *acuminate.*

Fig. 57.



Explain figures.

Fig. 58.

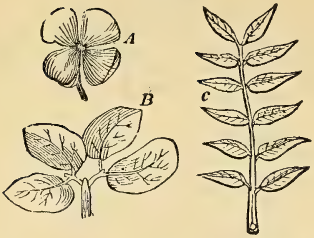


Fig. 59.

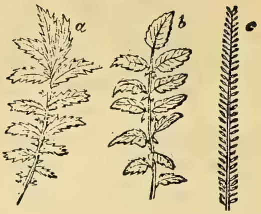


Fig. 60.

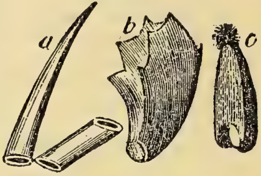


Fig. 58, A, is quaternate; the leaflets are *cuneiform, very entire.* B, a *mimosa* leaf; it is twice *binate.* C is equally pinnate; with six pairs of *pinnæ.*

Fig. 59, *a*, is *interruptedly pinnate*, the pinnæ being dissimilar in size. *b* is *unequally pinnate;* the leaflets are *stipuled.* *c* represents the compound leaf of a fern; it is *pinnate;* the stipe or *rachis* large and *compressed.*

Fig. 60, at *a*, is *cylindrical*, and *fistulous*, as in the onion, where the vascular and cellular tissues are developed so as to form a circle with a cavity in the center. *b* is a *fleshy* leaf, *deltoid* and *dentate.* *c*, a leaf which is *sub-ovate*, and *bearded* at the summit.

NOTE.—It is recommended to the pupil to practice drawing the various leaves which are given for examples; and to collect as many specimens of leaves as possible.

57. Leaves vary in *magnitude*, from the small leaves of some of the forest-trees of our climate, to the spreading Palms and Bananas of the torrid zone. As we approach the torrid zone, the leaves increase in magnitude.

a. We can, however, scarcely credit the reports of travelers, who say, that the Talipot-tree, in the Island of Ceylon, produces leaves of such size, that twenty persons may be sheltered by one single leaf. Although this account may be exaggerated, there is no doubt of the fact, that the leaves of the torrid zone are of a wonderful size; and that whole families, in those regions, can make their habitations under the branches of trees. Here we see the care of a kind Providence, which, in countries parched the greater part of the year by a vertical sun, has formed such refreshing shelters. Mungo Park, in his travels in Africa, remarks upon the many important uses of palm-leaves, serving as covering to cottages, baskets for holding fruit, and umbrellas for defence against rain or sun. These leaves answer as a substitute for paper, and were so used by the eastern nations. The magnitude of leaves often bears no proportion to the size of the plants to which they belong. The oak, and most other forest-trees, bear leaves, which appear very diminutive, when compared with those of the cabbage, or burdock.

58. Leaves, with respect to *Duration*, are, *Fugacious* when they fall early, or soon after their first appearance. *Deciduous*, falling at the commencement of winter; this is the case with the leaves of most plants, as far as 30° or 40° from the equator. *Persistent*, remaining on the stem and branches amidst the changes of temperature; such plants are called *Evergreen;* as the fir-tree and pine, and generally all cone-bearing and resin-

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57. Variation in the size of leaves—*a.* Leaves of the torrid zone.—**58.** Duration of leaves.

ous trees; these change their leaves annually, but the young leaves appearing before the old ones decay, the plant is always green. In our climate the leaves are mostly deciduous, returning in autumn to their original dust, and enriching the soil from which they had derived their nourishment. In the regions of the torrid zone, the leaves are mostly persistent and evergreen; they seldom fade or decay in less than six years; but the same trees, removed to our climate, sometimes become annual plants, losing their foliage every year. The passion-flower is an evergreen in a more southern climate.

59. The GREEN COLOR of leaves is owing to a coloring matter called *Chlorophyl* (from *chloros*, green, and *phyllon*, leaf), which floats in minute globules in the fluid of cells accompanied by starch grains. The green color becomes lighter or deeper according to the quantity of chlorophyl and the aggregation of cells. Leaves have not that brilliancy of color which is seen in the corolla or blossom; but the beauty of the corolla has only a transient existence; while the less showy leaf remains fresh and verdant after the flower has withered away. The substance of most leaves is so constituted as to absorb all the rays of light except *green;* this color is of all others best adapted to the extreme sensibility of our organs of sight. Thus, in evident accommodation to our sense of vision, the ordinary dress of nature is of the only color upon which our eyes, for any length of time, can rest without pain. But although green is almost the only color which leaves reflect, the variety of its shades is almost innumerable.

"No tree in all the grove but has its charms,
Though each its *hue* peculiar; *paler* some,
And of a *wannish-gray;* the *willow* such,
And *poplar*, that with silver lines his leaf;
And *ash* far stretching his umbrageous arm;
Of *deeper green* the *elm;* and deeper still,
Lord of the woods, the long-surviving *oak*."*

The contrast between their shades, in forests, where different families of trees are grouped together, has a fine effect, when observed at such a distance as to give a view of the whole as forming one mass. A small quantity of carbon, united to oxygen in the vegetable substance, and acted upon by light, is said to give rise to the various colors of plants.† If this theory be correct, the different shades of color in plants must be owing to the different proportion in which the carbon and oxygen are combined. When leaves languish from disease, they give off oxygen sparingly, and the chlorophyl assumes some shade of yellow or red.

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* Cowper.

† This idea coincides with the supposition, that the green color of leaves is changed to brown by the loss of an acid principle; that the petals of flowers change from purple to red by an increase of acid. The base of this acid is *oxygen*.

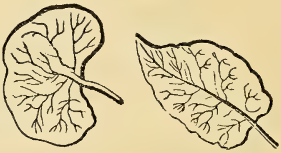
59. Chlorophyl.

LECTURE X.

ANATOMY AND PHYSIOLOGY OF LEAVES.—THEIR USE IN THE VEGETABLE SYSTEM.—APPENDAGES TO PLANTS.

60. The leaf, though simple in appearance, is complex in structure. It is composed of a *cellular system*, which is an expansion of the cellular integument; and a *fibro-vascular* system, which arises from the medullary sheath. The outer covering, or cuticle, is a continuation of that of the stem. Leaves are compared to the lungs of animals; they are organs for *absorption*, *exhalation*, *respiration*, and *digestion*. When leaves are wanting, as in the Prickly Pear (*Cactus*), the green surface of the stem appears to perform their office. Observe a dead leaf which has for some time been exposed to the action of the atmosphere; its *skeleton*, or *frame-work*, consists of various fibers, minutely subdivided, which originate from the petiole. After boiling the leaves slightly, or rubbing them in water, the *cuticle* easily separates, and the pulp, or cellular texture, may then be washed out from between the meshes of the veined net-work; thus, the most minute cords of the different vessels become perceptible, with their various divisions and subdivisions; these form what is called the *fibro-vascular* system. (See Fig. 61). Though in external appearance the organs which compose the *vascular* system of plants are analogous to the bones which constitute the foundation of the animal system, yet they are rather considered as performing the office of veins and arteries. They are found to be *tubular*. In some cases, this is ascertained by the naked eye; in others, it may be beautifully illustrated by immersing the fibers of the leaf in some colored liquid: on taking them out, they are found to contain internally a portion of the liquid. This experiment proves them to be *transparent*, as well as *tubular*. Leaves are pulpy or juicy according as they contain more or less parenchyma or cellular tissue. This tissue consists of a mass of little cells, various in

Fig 61.



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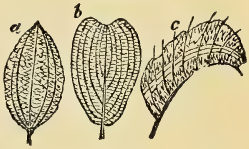
60 Structure of the leaf—Explain Fig. 61—Cellular texture.

size in different leaves; in some, with the most powerful magnifiers, the cells are scarcely perceptible; in others, they may be seen with the naked eye. These cells are of important use in the secretion and communication of substances through the leaf; and may thus be considered as a kind of gland, having a communication with the vascular system. The covering of the leaf, or the *cuticle*,* guards the vascular and cellular system from injury, and is the medium by which the leaf performs the important functions of absorbing nourishment, and exhaling such substances as are useless, or hurtful. The cuticle is sometimes covered with *downy* or *hairy glands*, which seem to afford security against changes of weather; such plants are capable of enduring a greater degree of heat than others. In some cases, the cuticle is covered with a *transparent varnish*, which preserves the plant from injury by too much moisture, and adds to the beauty of the leaves. The trees of Abyssinia and some other countries, which are subject to long rains and continued moisture, are thus shielded from the injurious effects of the weather.

Fig. 62.



When the surface of the cellular tissue is more ample than the vascular net-work, the leaf is *rugose* (Fig. 62, *a*); where, for every swelling of the upper surface of the leaf, there is a correspondent depression of the under surface: the sage has a leaf of this kind. When the net-work exists, but the meshes are destitute of cellular tissue, the leaf presents the appearance of lattice-work, and is said to be *cancellated.*

The leaves of an aquatic plant of Madagascar (*Hydrogeton fenestralis*, Fig. 62, *b*), are of this kind. Another example of this leaf is seen in the *Claudea elegans* (Fig. 62, *c*), a species of marine Algæ, found in New Holland; the veins are parallel to the sides, and cross the nerves.

61. *Special functions of Leaves.*—Leaves expose the fluids of the plant to the influence of air and light; they aid in the elaboration of the various vegetable secretions, in the formation of wood, and in the absorption of fluids and gases. In the cells of the leaves changes take place by the agency of light, by which oxygen is given off, and carbon remains in a fixed state. *Exhalation*, or *transpiration*, is the process by which the superabundant juices of the plant are given off; it takes place

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* The cuticle is sometimes called *epidermis*, from *epi*, around, and *derma*, skin; the true skin being not the outer covering, but a cellular substance beneath: thus, the thin skin upon the back of the hand, which so easily becomes rough, is the cuticle, or epidermis (sometimes called the scarf-skin), while the real skin is below.

Cuticle—Important office of the leaf—What is a rugose leaf?—What is a cancellated leaf? Explain Fig. 62.—61. Functions of leaves.

through the *stomata;* these are only open in the presence of light, therefore in the dark this process cannot proceed. *Absorption* is the peculiar office of the root, but leaves also perform this function, as water sprinkled on the leaves of a parched plant is well known to revive it. *Respiration* is performed chiefly by the leaves, but sometimes by the root; it consists in the absorption of oxygen and giving off carbonic acid. *Digestion* consists in the decomposition of carbonic acid, the fixation in the plant of solid carbon, and the evolution of oxygen.

The upper surface of leaves is usually of a deeper green, and performs a more important part in respiration than the under surface. The upper surface also repels moisture: a cabbage-leaf after a shower or heavy dew, shows the moisture collected in drops, but with no appearance of its being absorbed by the leaf. It has been found that the leaves of plants laid with their upper surfaces upon water, soon wither; although the leaves of the same plants, placed with their under surfaces upon water, retain their freshness for some days. Few among the vegetable tribes are destitute either of leaves, or green stems, which answer as a substitute. The *Monotropa*, or Indian pipe, is of pure white, resembling wax-work. Mushrooms are also destitute of any green herbage. It is not known in what manner the deficiency of leaves is made up to these vegetables.

62. The period in which any species of plant unfolds its leaves, was called by Linnæus, *Frondescence;* according to his observation in the climate of Sweden, the opening of the leaf-buds of the birch-tree is the proper time for the sowing of barley. The American Indians held that the best time for planting Indian corn was when the leaves of the white-oak first made their appearance; or, according to their expression, "are of the size of a squirrel's ears."

a. One of the phenomena of leaves is their *irritability*, or power of contraction, upon coming in contact with other substances. Compound leaves often possess this property; as the sensitive plant (MIMOSA *sensitiva*), and the American sensitive plant (CASSIA *nictitans*); on bringing the hand near them they shrink as if from the touch the warmth of the hand is supposed to produce the contractions of the leaves.

b. The *effect of light* upon leaves is very apparent, plants being almost uniformly found to present their upper surfaces to the side on which the greatest quantity of light is to be found.

c. Carbonic acid gas is the *food of plants;* this consists of carbon and oxygen, and is decomposed by the agency of light; the carbon becomes incorporated with the vegetable, forming the basis of its substance, while the oxygen is exhaled, or thrown off into the atmosphere.

d. Many plants *close their leaves at a certain period of the day*, and open them at another; almost every garden contains some plants in which this phenomenon may be observed; it is particularly remarkable in the sensitive plant and the tamarind-tree. This folding up of the leaves at particular periods, has been termed *the sleep* of plants; a celebrated botanist* remarks, "This may be as useful to the vegetable constitution, as real sleep to the animal." Linnæus was led to observe the appearance of plants in the night, from a circumstance which occurred in raising the Lotus plant; he found one morning some very thrifty flowers, but on looking for them at night, they were no longer visible. This excited his attention, and he began to watch their unfolding. He was thus led to investigate the appearance of other plants at the same time, and to observe their different manner of sleeping. He found, as darkness approached, that some folded their leaves together, others threw them back upon their petioles, or closed their corollas, thus exhibiting a

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* Sir J. E. Smith.

Of the upper and under surface of leaves.—62. Frondescence—*a.* Irritability—*b.* Effect of light—*c* What effect has light upon the carbonic acid gas imbibed by plants?—*d.* Sleep of plants variety of interesting phenomena. This state of relaxation and repose seems to depend on the absence of light: with the first rays of the morning sun, the leaves recommence their chemical labors by drawing in oxygen, the fibers of the roots begin to imbibe sustenance from the earth, and the whole vegetable machinery is again set in motion. It is not solar light alone which seems capable of producing its effect on plants; this has been proved by the following experiment. A botanist placed the sensitive plant in a dark cave, and at midnight lighted it up with lamps; the leaves, which were folded up, suddenly expanded; and when, at mid-day, the lights were extinguished, they again as suddenly closed.

63. The period of *the falling of the leaf* is termed the *defoliation* of the plant; this may be referred to the *death* of the leaf, and the *vital action of the parts to which it is attached.* If a tree be killed by lightning, the leaves will adhere to the dead branches because the latter have not the energy to cast them off. The development of buds, the hardening of the bark, and the formation of wood, accelerate the fall of the leaf. Heat, drought, frosts, wind, and storms, are all agents in their destruction. The *decay* of the leaf is supposed to be owing to the consolidation of the parenchyma, by the accumulation of solid matter conveyed to it by the sap, and left by evaporation. The *fall of the leaf* has been thus explained:—When the leaf and stem are both in a healthy state, the base of the former and the branch that bears it, both increase at the same rate, but after the decay of the leaf, its base can no longer adapt itself to the growing branch, which is constantly increasing in diameter by the formation of new wood. There is, consequently, a rupture of the connecting vessels, the leaf is disjointed at the base, or articulation, and falls off, as a dead part of a living animal is cast off. Endogenous stems do not increase in diameter, therefore their leaves decay, but do not commonly fall; they remain on the stem.

a. About the middle of autumn, the leaves of the sumach and grape-vine begin to look red, those of the walnut, brown, those of the honeysuckle, blue, and those of the poplar, yellow; but all sooner or later take that uniform and sad hue, called the *dead-leaf* color. The rich autumnal scenery of American forests is regarded by the European traveler with astonishment and delight, as far exceeding any thing of the kind which the old world presents. Painters, who have attempted to imitate the splendid hues of our forests, have, by foreigners, been accused of exaggeration; but no gorgeous coloring of art can exceed the bright scarlet, the deep crimson, the rich yellow, and the dark brown, which these scenes present.

b. The student who has learned something of the anatomy and physiology of leaves, will be induced to pay attention to them in their different stages, from their situation in the bud to their full growth and perfection,—will feel a new interest in their change of color, when the philosophy of this change is understood;—even the dry skeletons of leaves, which the blasts of autumn strew around us, may not only afford a direct moral lesson, as emblematical of our own mortality, but, in examining their structure, we are led to admire and adore the Power which formed them.

64. Leaf-like Appendages to Plants.—The uses of these

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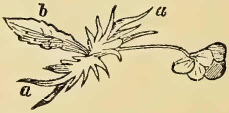
63. Defoliation—*a.* Change of color of leaves in autumn—American forests—*b.* Reflection.—64 Appendages.

organs are somewhat doubtful; but we should not infer because the design for which they were formed is in some measure concealed from us, that they were made for no purpose or exist by mere accident; it would be impious for us to imagine that all the works of God which we cannot comprehend are useless.

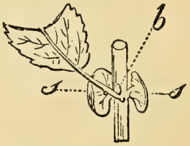
There are various vegetable organs which have been called by the general name of *appendages;* they are the following: *stipules*, *prickles*, *thorns*, *glands*, *stings*, *scales*, *tendrils*, *pubescence*, and *bracts*.

Fig. 63.



a. Stipules are membraneous or leafy scales, usually in pairs, at, or near the base of the leaf or petiole. They are subject to the same laws of venation, and perform the same offices as leaves. They sometimes develop buds in their axils. When they grow from the stem they are the rudiments of leaves; when from the base of the petiole, they are the undeveloped leaflets of a pinnate leaf. We see therefore that stipules are *modified* or *transformed* leaves. The stipules furnish characters used in botanical distinctions. They are various in their forms and situations, are found in most plants, though sometimes wanting. In the garden violet, VIOLA *tricolor* (Fig. 63, *a a*), the stipules are *lyrate-pinnatifid*, while the true leaf (*b*) is oblong and crenate. The most natural situation of the stipules is in pairs, one on each side of the base of the foot-stalk, as in the sweet-pea; some stipules fall off almost as soon as the leaves are expanded, but in general they remain as long as the leaves. Fig. 64 shows a portion of a branch of a species of willow; *l* represents part of a single petiolate leaf; *s s*, stipules; *b*, bud in the axil of the leaf.

Fig. 64.



b. Prickles arise from the bark; they consist of hardened cellular tissue, and are removed with the cuticle; they have not like the thorn connection with the wood, nor do they disappear by cultivation; they are straight, hooked, or forked. They are usually found upon the stem, as in the rose; but in some cases they cover the petiole, as in the raspberry; in others, they are found upon the leaf or the calyx, and in some instances, upon the berry, as in the gooseberry.

c. Thorns, or spines, are distinguished from prickles by growing from the woody part of the plant. Although the bark may be separated from a thorn-bush, the thorn will still remain projecting from the wood.

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a. Stipules—*b.* Prickles—*c.* Thorns.

At Fig. 65, the thorn (*a*) remains on the stem, while the bark (*b*) has been peeled off. In the prickle (*c*) the whole appears separated from the plant. The thorn appears to be an imperfectly developed bud, which has become indurated. Leaves themselves often become spines by the hardening of their midrib or primary veins, and the diminution or absence of parenchyma. Branches are sometimes arrested in their progress at an early stage of their development, and do not appear beyond the surface of the stem; they form a *knot.*

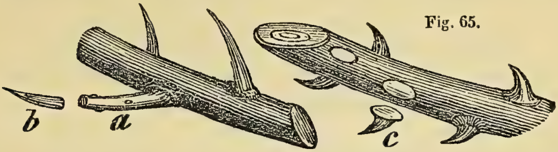


Fig. 65.

The thorns, in some plants, have been known to disappear by cultivation. Linnæus imagined, that in such cases the trees were divested of their natural ferocity, and became tame.

Thorns are now considered as buds, which a more favorable situation converts into luxuriant branches; they have been compared to the horns of animals.

d. Glands are collections of cells forming secretions. In many plants the secretions from glands give their peculiar fragrance. Glands are sometimes attached to the base of the leaf, and sometimes occur in the substance of leaves, as in the lemon and myrtle, causing them to appear dotted when held to the light. They are found on the petioles of the passion-flower, and between the teeth and divisions of the leaves of many plants. Glands are composed of a single cell dilated at the apex (as Fig. 66, *a*); of several cells united together, the upper one being the secreting organ (*b*) of two secreting cells (*c*), or of more than two (*d*). The *stings* of the nettle are glands, formed of a single conical cell dilated at its base, and closed at the apex by a small globular button which breaks at the slightest touch, discharging an acrid fluid that enters the puncture in the skin made by the stiff, hair-like process of the gland. When a nettle is grasped with violence the sting is crushed, and no pain is caused by the discharge of its secretion. Nettles are similar in their structure and office to the fangs of serpents.

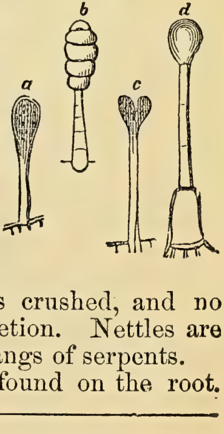


Fig. 66.

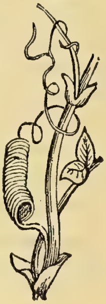
e. Scales are membraneous expansions found on the root.

d. Glands—Stings—*e.* Scales.

stem, and branches, of plants; they are *imbricated* upon the calyces of many of the compound flowers, often green, but sometimes colored. We have seen in buds how important are the scales in protecting the embryo plant during the winter. Scale-like calyces surround the flowers of grasses under the name of *glumes.* Scales envelop and sustain the stamens and fruit of the pine, oak, chestnut, &c.

f. Tendrils (Fig. 67). A leaf-bud is sometimes developed as a slender, spiral or twisted branch. In the vine the tendrils are considered as the terminations of separate axes, or *transformed terminal buds.* By means of tendrils weak stems attach themselves to other bodies for support; they usually rise from the branches, in some cases from the leaf, and rarely from the leaf-stalk or flower-stalk. Tendrils are very important and characteristic appendages to many plants. In the trumpet-flower and ivy they serve for roots, planting themselves into the bark of trees, or in the walls of buildings. In the cucumber and some other plants they serve both for sustenance and shade. Many of the papilionaceous, or pea blossom plants, have twining tendrils, which wind to the right, and back again. Among vegetables which have tendrils, has been discovered that property which some have called the *instinctive intelligence of plants.* A poetical botanist represents the tendrils of the gourd and cucumber, as "creeping away in disgust from the fatty fibers of the neighboring olive." It has been ascertained by experiments, that the tendrils of the vine, and some other plants, recede from the light, and seek opake bodies. The fact with respect to leaves is directly the reverse of this.

Fig. 67.



Some plants creep by their tendrils to a very great hight, even to the tops of the loftiest trees, and seem to cease ascending, only because they can find nothing higher to climb. One of our most beautiful climbing plants is the CLEMATIS *virginica*, or virgin's bower, which has flowers of a brilliant whiteness. Its pericarps richly fringed, are very conspicuous in autumn, hanging in festoons from the branches of trees, by the sides of brooks and rivers.

g. Pubescence includes the down, hairs, wooliness or silkiness of plants. The pubescence of plants varies in different soils, and with different modes of cultivation. The species in some genera of plants are distinguished by the direction of the hairs. The microscope is often necessary in determining with precision the existence and direction of the pubescence. It has been suggested that these appendages may be for similar pur-

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f. Tendrils—*g.* Pubescence.

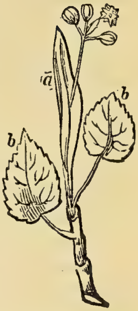

Fig. 68.

poses as the fur, hair, and bristles of animals, viz., to defend the plants from cold, and injuries from other causes.

h. Bracts are rudimentary dwarfed leaves, sometimes mere scales, at others differing little from the ordinary leaf except in the smaller size. It is sometimes difficult to decide whether bracts should be ranked with the foliage, or as parts of the flower. Bracts may be situated along the peduncle or at its base.

At Fig. 68, the real leaves are shown at *b b*, and the bract at *a*; the former being *cordate* and *crenate*, the latter *lanceolate* and *entire.*

In some plants, as in several species of sage, the transition from leaves to bracts is so gradual, as to render it difficult to distinguish between them, and a considerable part of the foliage is composed of the bracts. In the crown-imperial, the stem is terminated by a number of large and conspicuous bracts. These appendages are sometimes mistaken for the calyx. Bracts are *green* or *colored, deciduous* or *persistent.* The orchis tribe have green leaf-bracts. No plants of the class *Tetradynamia* have bracts.

LECTURE XI.

CALYX.

65. We have considered the organs of *nutrition* and *vegetation;* these have been called the fundamental organs of plants, because they are mere modifications or transformations of them. We are now to examine more fully than we have done the *reproductive organs*, called *organs of fructification.*

a. Their names were considered when commencing the analysis of flowers; but we are now to examine them with more minute attention, and to remark upon their different uses in the vegetable economy. We have arrived at that part of the plant, which is the ornament of the vegetable kingdom. Flowers are delightful to every lover of nature; a bouquet, or even the simplest blossom, presented by a friend, interests the heart. How many pleasant thoughts are awakened by the fresh and perfumed incense which ascends from flowers! What woman does not love flowers! yet many regard them merely as beautiful objects, without being aware that they might be rendered far more interesting by a scientific knowledge of the relations and uses of their various parts. Many spend years in cultivating plants ignorant of their botanical characters, when even a few hours' study might unfold the beautiful arrangement of botanical science, and open to the mental vision a world of wonders.

Although every part of a plant offers an interesting subject for study, the beauty of the blossom seems by association to highten the pleasure of scientific research. Flowers are indeed lovely, but like youth and beauty they are fading and transient; they are, however, destined for a higher object than a short-lived admiration; for to them is assigned the important office of producing and nourishing the

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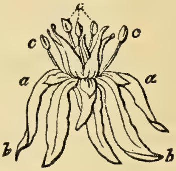
h. Bracts—Difference between the real leaf and the bract.—65. Second division of vegetable organs—*a.* Reflections fruit. Like them should the young improve the bloom of life, so that when youth and beauty shall fade away, their minds may exhibit that fruit which it is the business of youth to nurture and mature.

66. *The Flower and its appendages.*—The essential organs of reproduction in flowering plants are the *Flower*, the *Fruit*, and the *Seed.* The flower consists of *whorled leaves* or *verticils* placed on an axis called the *thalamus* or *torus.* There are in most perfect plants four of these whorls. It is the normal law that each of these whorls is equal in number of parts, and alternate in position.

At Fig. 69, the calyx, *a a*, is composed of a whorl of five equal sepals; a corolla, *b b*, of the five petals in an inner whorl alternating with the parts of the calyx; five stamens, *c c*, in a whorl within the corolla and between its parts and opposite to the pieces of the calyx; and the five parts of the pistil follow the same normal rule.

Fig. 69



But though in many cases it is easy to trace this arrangement, there are irregularities produced by the *union* of *one part* with another by the *absorption* or *degeneration* of some portions, and by the multiplying (*deduplication*), or disguising of others in various ways. Of the four whorls, the two outer are called *floral envelopes;* the two inner, *essential organs.* When calyx and corolla are both present, the plants are *dichlamydeous;* when one of these organs is wanting, *monochlamydeous;* and when both are wanting, *achlamydeous.* The manner in which sepals and petals are situated in the flower-bud is termed their *æstivation*, or *præfloration*, which is the same to the flower-bud as venation is to the leaf-bud. This is *valvate* when the sepals or petals fit by their edges, as in the petals of umbelliferous plants; *imbricated* when the outermost pieces cover the margins of the inner, as in the calyx of the Hypericum; *twisted* or *contorted* when each piece overtops the next one and the whole appears spirally twisted.

67. The *calyx* consists of verticillate leaves, called *sepals* or *phylla.* The calycine leaves are sometimes separate from each other, in which case the calyx is *polysepalous*, or *polyphyllous;* when the leaves of the calyx are united the calyx is said to be *gamosepalous* or *gamophyllous.*

a. The calyx may be wanting, as in the lily and tulip. The corolla is also wanting in many plants; as in most of the forest-trees, which to a careful observer may seem to produce no flower; but the presence of a stamen and pistil, is in botany considered as constituting a *perfect flower.* These two organs are essential to the perfection of the fruit; and when a flower is destitute either of stamens or pistils, it is termed *imperfect.* A flower is said to be *incomplete* when any of the seven organs of fructification are wanting. The word calyx is derived from the Greek, and literally signifies a *cup;* it is the outer cover of the corolla, and usually green,

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66. The flower—Normal law respecting its parts—Irregularities, how caused?—Names of the four whorls.—67. The calyx—*a.* Perfect or imperfect flower

when not green, it is said to be *colored.* This organ is an expansion of the bark of the flower-stalk, as appears from its color and texture. The calyx usually envelops the corolla, previous to its expansion, and afterward remains below or around its base.

b. In the calyx are three parts, very distinct in calyces which are long and cylindric: these are, 1st, the *tube*, which rises from the base; 2d, the *throat*, above the tube; and 3d, the *mouth*, or the upper and expanded part; the tube of the calyx is *cylindric* in the pink, and *prismatic* in the stramonium.

c. The position of the calyx with respect to the ovary offers an important mark of distinction between different genera, and also between different natural families of plants. The calyx is said to be *superior* when it is situated on the summit of the ovary, as in the apple; it is *inferior* when situated below the ovary, as in the pink. In many plants the calyx is neither superior nor inferior, but is situated around the ovary. When the calyx drops off before the flower fully expands, it is called *caducous;* the petals of the poppy are, at first, inclosed in a calyx of two sepals, but these fall off before the flower is full blown. When the calyx withers, and drops off with the corolla, it is called *deciduous;* when it remains until the fruit is matured, it is called *persistent.* Upon a pea-pod the calyx may be seen as perfect as it was in the blossom. The tube of the calyx is sometimes united to the pistil, and enlarges so as to form a part of the fruit, as in the apple, pear, &c., where the dry sepals may be seen on the summit of the fruit. In the wintergreen (*Gaultheria procumbens*) the berries consist of the inflated, juicy sepals.

68. *Perianth* (from the Greek, *peri*, around, *anthos*, flower). This is the only real cup or calyx;—in the rose it is *urn*-form, with leaf-like divisions at the top. In the pink, the perianth is long and tubular, having the border *dentate* or toothed. The hollyhock has a double perianth. The term perianth is used when a flower has but one envelope, as in the tulip; it is often difficult to determine whether this envelope should be called a corolla or calyx. *Involucrum* (from the Latin, *involvo*, to wrap up); this kind of calyx is usually found at the base of an umbel, as in the carrot. It is composed of several bracts, sometimes very small, crowded into a whorl. The involucrum is said to be *universal*, when it belongs equally to the whole of an aggregate flower; and *partial*,* when it incloses one floret, which with others constitutes a compound or aggregate flower. The term involucrum is also applied to the membraneous covering in the fructification of ferns. *Ament* or *catkin*† (by some classed as a mode of inflorescence) consists of many chaffy scales, ranged along a thread-like stalk or receptacle; each scale protects one or more of the stamens or pistils, the whole forming one aggregate flower. The ament is common to forest-trees, as the oak and chestnut; and is also found upon the willow and poplar. In some trees the staminate flowers are inclosed in an ament, and the pistillate in a perianth. The *Spatha*, or sheath, first incloses the flower, and, when this expands, bursts lengthwise and often appears at some distance below it. This is, by some botanists, considered as a *petaloid bract.* It

* See Fig. 135, *a a.*

† See Fig 95.

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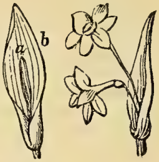
b. Parts of the calyx—*c.* Position with respect to the ovary.—68. Perianth—Involucrum—Ament—Spatha.

is only found in Endogenous plants; is very large in some palms. The wild turnip (Arum) furnishes an example of a spatha inclosing a *spadix* (Fig. 70, *a*).

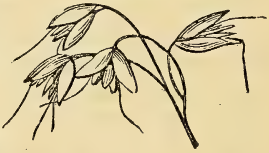
From the peculiar appearance of the spadix as it stands surrounded by the spatha, it is sometimes called *Jack-in-the-box.* The spatha is common in many of our cultivated exotics, as in the Narcissus, where it appears brownish and withered after the full expansion of the flower. Fig. 70, *b*, represents the spatha of the Arum; Fig. 70, *c*, represents the spatha of the Narcissus. In the Egyptian Lily (*Calla ethiopica*), the spatha is white and permanent, and the stamens and pistils grow upon different parts of the spadix. Palms have a spadix which is often fruit-bearing.

Fig. 70.



a. Glume (from *gluma*, a husk). The flowers of the grasses have neither calyx nor corolla; the essential organs (stamens and pistils) are surrounded by small bracts or glumes, called by Linnæus the calyx. In the oat and wheat it forms the *chaff*, a part which is thrown away as worthless. In the oat (Fig. 71) there are two bracts, the one a little lower than the other, and called the *inferior* or *outer*, and the opposite one the *superior* or *inner* glume. In some of the grasses, the glumes include many flowers.

Fig. 71.



b. The bracts situated at the base of each separate flower are called *glumelles* or *paleæ* (by Linnæus, the corolla); while the glumes at the base of a spikelet of flowers, answer to the involucrum. In the oat (Fig. 71) there is, proceeding from the back of the palea, a beard called an *awn;* when this proceeds from the apex of the valve, it is called a *seta* or *bristle.* The glumes are never awned, but sometimes bear bristles. The bracts of grasses are *transformed petioles*, the awn is the *midrib*, and bristles are extensions of the same. Within the paleæ, at the base of the ovary, may often be found one or two minute bracts, called *squamulæ*, or little scales.

c. Calyptra (from the Greek), signifying a veil. It is the cap, or hood of pistillate mosses, resembling in form and position the extinguisher of a candle.* *Volva*, the ring, or wrapper of the fungus plants; it first incloses the head of the Fungus, afterward bursts and contracts, remaining on the stems, or at the root.†

d. We have followed the divisions of Linnæus in describing the different kinds of calyces. We find that the calyx is not essential, but its presence adds to the completeness of the flower; in some cases it is the most showy part; as in a species of the Lady's ear-drop, where it is of a bright scarlet color, and in the Egyptian Lily, where it is pure white. The calyx is of use in protecting the other parts of the flower before they expand, and afterward supporting them in their proper position. Pinks having petals with long and slender claws which would droop or break without support, have a calyx. Tulips having firm petals, and each one resting upon a broad strong basis, are able to support themselves, and they have no calyx. In some plants the calyx serves as a seed-vessel, as in the order *Gymnospermia*, of the class *Didynamia*.

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* See Fig. 160, *c*

† See Fig. 161, *d*.

a. Glume—*b.* Paleæ—*c* Calyptra—Uses of the calyx.

LECTURE XII.

COROLLA.

69. In observing the development of the plant from the cotyledons upward, we see the leaves become gradually more perfect in their structure. When they tend toward the formation of the calyx there is a *contraction* in the surface. The corolla is produced by a new *expansion* or development. The petals are usually longer than the sepals, and more delicate in texture. The affinity which exists between the calyx and corolla is obvious in many plants where the calyx is partly green, partly colored, as if tending to pass into a petaloid state.

a. "The idea of petals being modified, or transformed leaves, seems to be further corroborated by the structure of papilionaceous flowers. The greater portion of the plants which bear that kind of flowers, have also pinnate leaves; and the structure of those flowers presents evident indications of a similar pinnate arrangement. The vexillum may be regarded as two leaflets (or *pinnæ*) soldered by their margins, into one large petal,—the *alæ*, or wings, next present an obvious pair of pinnæ—and finally the keel consists of two petals more or less soldered together, representing the last pair of an even-pinnate leaf, of six leaflets; all of which are thus modified and brought together into the form of a papilionaceous corolla. The petals are arranged in successive pairs, the vexillum being the lowest on the receptacle, or torus, and partially embracing others with its amplexicaul base."*

70. Linnæus considered the calyx as formed from the fibers of the outer bark, and the corolla as a continuation of the inner coat of the same.

"The *bark* of the plant," says Darlington, "is the *raw material* from which are formed and elaborated all the multiform organs or appendages to the stem and branches."

The texture of the corolla is delicate, soft, watery, and colored; it exhales carbonic acid gas, but not oxygen. The rich and variegated colors of flowers are owing to the delicate organization of the corolla; and to this cause the transient duration of this organ may also be attributed.

a. Corollas are white, yellow, blue, violet, &c.; in some, different colors are deli-

* Dr. Darlington.

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69. Transformation of organs—*a.* Structure of papilionaceous flowers.—70. Corolla—*a.* Color of the corolla.

cately shaded, and blended; in others, they meet abruptly, without any intermediate tint. The color of the corolla, in the same species, often varies without any assignable cause. This fact is strikingly illustrated in the *four o'clock* (MIRABILIS); the flowers of which are sometimes of pale yellow, sometimes bright crimson, and often richly variegated. The florist watches these changes, and, as far as possible, avails himself of them in the production of new beauties in the vegetable kingdom. The corolla before blossoming is folded in the calyx, as the leaves are within the scales of the leaf-bud. In most cases, the calyx and corolla are distinctly marked The color usually constitutes a striking mark of difference; the calyx being ordinarily green, and the corolla of a more lively hue. But the color is not always a criterion, for in some cases the calyx is beautifully colored. In the FUSCHIA (*Lady's ear-drop*), the calyx is of a bright scarlet; we might at first think it to be the corolla; but on removing the scarlet coat we see, wrapped around the eight stamens, a purple covering; on taking off each piece carefully, we find four petals, as distinct as the petals of a rose.

71. The parts of the corolla or petals, according to normal arrangement, alternate with the sepals, and either equal them, or are some multiple of their number. But this symmetrical arrangement of nature is often broken up, by peculiar circumstances attending the growth, as in CHORISIS or *dedoublement*, which terms signify *unlining*, meaning that the organ in question *unlines* or separates into two or more layers, each having the same structure, and thus increasing the *normal number* of organs. When the corolla falls off soon after flowering, as in the poppy, it is said to be *caducous;* when it fades and withers upon the stalk, as in the blue-bell, it is then said to be *marescent.* A flower without petals is said to be *apetalous.* Petals are said to be *definite* when their number is not more than twenty; *indefinite*, when they exceed that number. The parts into which a corolla naturally falls, may be considered as so many petals. The name *polypetalous* is given to corollas having separate petals, while *monopetalous* is applied to those which appear to have but one petal; but, as it is now admitted that all corollas are formed of several united petals, the term *gamopetalous* (from *gamos*, union), or united petals, is often used; yet, as the term monopetalous has been incorporated into the science of botany, it continues in use. The union of petals generally takes place at the base, and extends more or less toward the apex. *Monopetalous corollas* (or when the petals unite so as to form but one piece) consist of the *tube*, *throat*, and *limb.* The *tube* is the lower part: the *throat* the entrance into the tube; it is either open, or closed by scales or hairs. The lamina or *limb* is the upper border of the corolla. In *Polypetalous corollas*, each petal consists of two parts, the *lamina* and *claw.* Petals, properly so called, belong to Exogenous plants, for in the Endogenous, the flower consists of a perianth, which is considered as a calycine envelope. The venation of petals resembles that of the leaves of Exogenous plants; the

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Its situation before expanding—How distinguished from the calyx ?—71. Normal arrangement of the petals—Duration—Parts of the corolla—Forms of monopetalous corolla.

claw being analogous to the petiole, and the lamina to the expanded part of the leaf. The structure of petals is like that of leaves, except that the cellular tissue is more delicate, and the fibrous system, or veins, consists of spiral vessels without woody fiber; they have sometimes breathing pores, or *stomata*. The *lamina* (Fig. 72, *a*) is the upper, and usually the thinner part of the petal; its margin is sometimes *entire*, as in the rose; sometimes crenate, as in the pink. The *claw* (Fig. 72, *b*) is the lower part of the petal, and inserted upon the receptacle; it is sometimes very short, as in the rose; in the petal of the pink (Fig. 72) it is long and slender. The limb and tube of monopetalous corollas correspond to the claw and lamina of the polypetalous. The corolla is *superior* when inserted above the germ, *inferior* when below. It is *regular*, when each division corresponds to the other, as in the rose and pink. When the parts do not correspond with each other, a corolla is *irregular*, as in the pea and the labiate flowers.

Fig. 72.

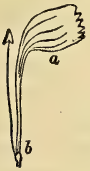


Fig. 73.

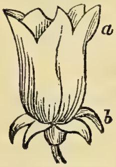


Fig. 74.

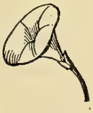


Fig. 75.

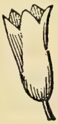
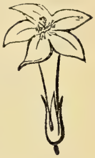


Fig. 76.



72. *Gamopetalous corollas* may, according to their forms, be divided as follows: *Bell-form* (*campanulate*); here the tube is not distinct, but the corolla gradually spreads from the base. Fig. 73 is the representation of a bell-form corolla; it is monopetalous; the limb (*a*) is five-parted; calyx (*b*), five-parted; corolla superior: the blue-bell of the gardens offers a fine illustration of this kind of corolla. *Funnel-form*, having a tubular base, and a border opening in the form of a funnel, as the morning-glory (Fig. 74). *Cup-shaped*, differing from funnel-shaped, in having its tube and border less spreading; and from bell-form, in not having its tube appear as if scooped out at the base (Fig. 75). *Salver-form*, from an ancient drinking-glass called a *salver;* this has a flat, spreading border, proceeding from the top of a tube (Fig. 76). *Wheel-form*, having a short border without any tube or with a very short one (Fig. 77); this kind of corolla may be seen in the mullein. *Labiate*, or lipped (so called from a fancied resemblance to the lips of an animal), consists of two parts; such corollas are said to be *personate*, having the throat closed; or *ringent*, with the throat open, as at Fig. 78: this kind of corolla results from the unequal co

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72. Gamopetalous corollas.

hesion of the petals; the two upper ones form the upper lip, and three petals cohering in the same manner, form the lower lip.

73. *Polypetalous corollas* are of various forms, as follows: *Cruciform*, consisting of four petals of equal size, spreading out in the form of a cross, as the radish, cabbage, &c. (Fig. 79). *Caryophyllous*, having five single petals, each terminating in a long claw, inclosed in a tubular calyx, as the pink (Fig. 80). *Liliaceous*, with six petals, spreading gradually from the base, so as to exhibit a bell-form appearance, as in the tulip and lily

Fig. 77.

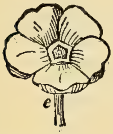


Fig. 78.

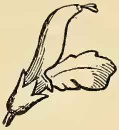


Fig. 79.

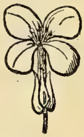


Fig. 80.

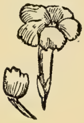
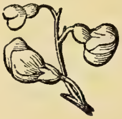


Fig. 81.



Rosaceous, formed of roundish spreading petals, without claws, or with very short ones, as the rose and apple. *Papilionaceous;* the name is derived from the word *papilio*, a butterfly, on account of a supposed resemblance in form, as the pea-blossom (Fig. 81). This is an *irregular polypetalous* corolla; it has five petals; the upper and largest is called the *banner* (*vexillum*), the two lateral ones are the *wings* (*alæ*), and the two lower ones, cohering by their lower margins so as to form a single piece, are called the *keel* (*carina*). Among irregular polypetalous corollas may be included the *orchidaceous*, which are spurred, hooded, &c., presenting many anomalous forms.

74. The *odor of flowers* has its origin in the volatile oils, elaborated by the corolla; its production results from causes both external and internal, but in both cases equally beyond our observation. Temperature renders the odor of flowers more or less sensible: if the heat is powerful, it dissipates the volatile oils more rapidly than they are renewed; if the heat is feeble, the volatile oils remain concentrated in the little cells where they were elaborated; under these circumstances the flowers appear to possess but little odor. But if the heat be neither too great nor too little, the volatile oils exhale without being dissipated, forming a perfumed atmosphere around the flowers.

a. We perceive the reason, that when we walk in a flower-garden in the morning or evening, the flowers seem more fragrant than in the middle of the day; the air being then more charged with humidity, is another cause of an increase of fragrance; as the moisture, by penetrating the delicate tissue of the corollas, expels the volatile oils. There are some exceptions to the laws just stated; for some flowers are only odorous during the night, and others during the day. Some flowers exhale fetid odors, which attract such insects as are usually nourished by putrid

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73. Forms of polypetalous corollas.—74. Odor of flowers—*a.* When flowers are most fragrant—Odors sometimes disagreeable.

animal substances. Many flowers exhale sweet odors; but, however odors may differ in the sensations which they produce, it is certain that powerful ones have a stupefying, narcotic effect upon the nerves, and that it is dangerous to respire for any great length of time even the most agreeable of them in a concentrated state.

b. One important office of the corolla, is to secure those delicate and important organs which it incloses, the stamens and pistils, from all external injury, and to favor their development. After the germ is fertilized by the influence of the pollen, the corolla fades away, and either falls off or remains withered upon the stalk; the juices which nourished it then go to the ovary, to assist in its growth, and enable it to become a perfect fruit. Another use of the corolla seems to be, to furnish a resting-place for insects in search of honey. The corolla is supposed by Darwin to answer the same purpose to the stamen and pistils, as the lungs in the animal system; each petal being furnished with an artery which conveys the vegetable blood to its extremities, exposing it to the light and air under a delicate moist membrane; this vegetable blood, according to his theory, is then collected and returned in correspondent veins, for the sustenance of the anthers and stigmas, and for the purpose of secreting honey. After all our inquiries into the uses of the corolla, we are obliged to acknowledge that it appears less important in the economy of vegetation, than many less showy organs. It seems chiefly designed to beautify and enliven creation by the variety and elegance of its forms, the brilliancy of its coloring, and the sweetness of its perfume.

75. In many flowers there is an appendage, formerly called the *nectary* (from *nectar*, *honey*), which secretes a peculiar fluid, the honey of the plant. Linnæus considered the nectary as a separate organ from the corolla; and every part of the flower which was neither stamen, pistil, calyx, nor corolla, he called a nectary; but what he called nectaries are at present regarded as modifications of some part of the flower; in some cases a mere prolongation of the petals, and in others an inner row of petals or modified stamens adhering to the corolla. With this explanation, we shall use the term nectary as it has been applied by preceding writers.

a. The term DISK is now applied to whatever appendage appears between the stamen and pistils, formerly called nectaries; the disk is often formed from the degeneration and transformation of stamens, presenting the appearance of scales, glands, hairs, &c. Its common form is that of a *rim* or *scale*, either surrounding the base or appearing at the tip of the ovary; it sometimes consists of glands or abortive stamens, alternating with the stamens, sometimes at their base, showing a whorl of abortive stamens.

Sometimes the disk or nectary is a mere *cavity*, or gland, as in the lily. The crown-imperial exhibits in the claw of each of its petals a nectary of this kind each one being filled with a sweet liquid, the secretion of the flower. The six nectariferous glands at the base of the corolla are represented at Fig. 82. The petals are supposed to be cut to show the base of the flower. The analogy of petals with stamens is argued from the existence of these glands or cavities, the fluid contained in them being found to be of the same nature as that which is elaborated into pollen.

In the ranunculus the secreting organ is a production of the corolla in the form

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Dangerous if respired for a long time—*b*. Offices of the corolla—Darwin's theory with respect to the corolla.—75. Nectary—Its use—*a*. Nectaries not considered as a special organ—*a*. Disk.

of a *scale;* in the violet, a process of the same, in the form of a *horn* or *spur;* in the columbine, in the form of a *horn.* In the monk's-hood, one of the petals being concave, conceals the nectaries; they are therefore said to be *hooded.* In the honeysuckle, we find at the bottom of the tube a nectariferous liquid; yet there is no appearance of any gland or organ by which it could have been secreted, unless we suppose the tube to have performed this office. With respect to the purpose for which honey is secreted by the nectary and other parts of the flower, there seems, among authors, to be a difference of opinion. Darwin supposes this to be the food with which the stamens and pistils are nourished. Smith asserts, that the only use of honey with respect to the plant, is to tempt insects, which, in procuring it, scatter the dust of the anthers, and fertilize the flower, and even carry the pollen from the barren to the fertile blossoms; this is particularly the case in the fig-tree. Although in the case of plants whose stamens and pistils are on separate flowers, we see this advantage arising from the fact of insects being attracted by the honey, yet the greater number of plants do not need any assistance in conveying pollen to the stigmas. Some imagine that honey contributes to the perfection of the stamens: but plants that do not appear to secrete honey have perfect stamens. One thing, however, is certain with respect to this fluid, that without detriment to the plant, it yields to the industrious bee the material for the manufacture of honey, a luxury highly valued from the most ancient times. Virgil knew that bees made honey from the juices which they gathered from flowers; and we, indeed, on this subject, know but little more than he has beautifully expressed in his pastorals.

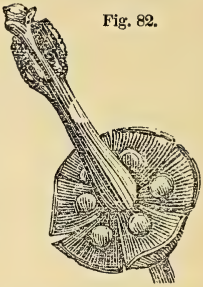
Fig. 82.

LECTURE XIII.

STAMENS AND PISTILS.

76. THE *stamens and pistils are, in all Phcnogamous plants, indispensable to the perfection of the fruit.* They are, in most plants, inclosed by the same envelope, or stand on the same receptacle; in the class MONŒCIA, *they are on different flowers which spring from one common root;* and in DIŒCIA, *they are on different flowers, springing from different roots.* Yet, however distant the stamens and pistils may be, nature provides ways by which the pollen from the staminate flowers is conveyed to the pistillate, to assist in perfecting the seed. A *stamen* usually consists of two parts, but the filament, or stalk which supports the anther, is no more essential to a stamen than a petiole is to a leaf. If the stamens be fewer than the pieces, either of the calyx or corolla, *this is* a proof that the true or normal number is either abortive or transformed; if they are

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Different forms of nectaries—Opinions of different writers respecting the secretion of honey.—76. Stamens and pistils necessary to the perfection of the fruit—*a.* Facts respecting the stamen.

more numerous, this is owing to the development of one or more additional whorls by *dedoublement*, or unlining. Most Endogenous plants have either three or six stamens, and the number five or ten is most common in Endogenous plants. The stamens arise from the receptacle (*torus*) of the flower, between the base of the petals and the pistils.

77. *Stamens* are exterior with respect to the pistil, and *interior* with respect to the corolla. They exhibit a variety of positions with respect to the pistil. If the stamens are inserted *upon* the pistil, as in umbelliferous plants, they are said to be *epigynous* (from *epi*, upon, and *gynia*, pistil); if the stamens are inserted *under* the germ, as in cruciform plants, they are said to be *hypogynous* (from *hypo*, under, and *gynia*, pistil); when the stamens are inserted upon the calyx, and thus stand *around* the germ, as in the rosaceous plants, they are said to be *perigynous* (from *peri*, around, and *gynia*, pistil). The normal position of stamens is below the pistil.

When a corolla is monopetalous, the number of the stamens is usually either equal, double, or half that of the divisions of the corolla; the stamens in such flowers never exceed twenty. In polypetalous corollas the number of stamens is often greater. When they equal the divisions of the corolla, they usually alternate with these divisions. When the number of stamens is double the divisions of the corolla, half of the stamens are usually placed in the intervals of the divisions, and the remaining half before each lobe of the corolla, corresponding to the intervals in the divisions of the calyx. If any of the stamens are barren, or without anthers, they will be found to be those which are placed before the lobes of the corolla. Like the other parts of the flower, the stamens are modified leaves, resembling them in their structure, and like them consisting of cellular and vascular tissue. They appear at first as cellular projections, and are arranged in a spiral form, unless the normal law be changed by circumstances. They have a greater resemblance to petals than to leaves, and we often see a gradual transition from petals to stamens.

a. In commencing the analysis of flowers according to the Linnæan system, we learned that the *number* of stamens, their *position*, *relative length*, and *connection*, taken either singly or in combination, afford certain and distinctive marks for purposes of classification.

In the first place we find the stamens differing in *number*, in different plants; some plants have but one, some two, and so on, till we come to ten; when they have more than ten, we find the number in the same plant varies, and therefore we cannot depend on this circumstance for further classification.

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77. Position of the stamens with respect to the pistil—Divisions of monopetalous corollas usually in proportion to the number of stamens—Situation of the stamens with respect to the divisions of the corolla—*a.* Stamens used for purposes of classification.

We then resort to *position*, and consider whether the stamens are inserted upon the calyx or the receptacle, thus furnishing an eleventh and a twelfth class.

Inequality in the length of stamens, when they are either four or six, furnishes us with a thirteenth and fourteenth class.

The *connection or union of stamens* gives us the fifteenth class, where the filaments of the stamens are united in one set; the sixteenth class, where they are in two sets · the seventeenth, where the anthers of the stamens are united.

The three remaining classes of phenogamous plants are distinguished by the *position of the stamens with respect to the pistils.* In the eighteenth class the stamens stand on the pistil; in the nineteenth the stamens and pistils are on separate flowers on the same plant; in the twentieth they are on separate plants; and in the twenty-first they are invisible, or wanting.

78. *Parts of the Stamen.*—The *Filament* is so called from *filum*, a thread. It consists of a thin *epidermis*, *cellular tissue*, and *spiral vessels;* the latter extend through the whole length, and terminate at the union of the filament with the anther. Filaments vary in their form; some are long and slender, as in the pink; others are short and thick, as in the tulip. They are usually smooth, but in the mullein they are bearded, in the spider-wort they are covered with down. In most cases a filament supports but one anther, but sometimes it is forked, and bears two or more; in some instances many filaments have but one anther. When the filaments are inclosed in the tube of the corolla, they are said to be *inserted;* when they extend out of it, *exserted.* In some cases the filament is wanting, and the anther is sessile, or immediately attached to the corolla.

a. In double flowers, the stamens, which seem to be intimately connected with the parts of the corolla, are changed to petals. This is the effect of cultivation, which, by affording the stamens excess of nourishment, causes them to expand and thus assume the form of petals. In some double flowers almost every trace of the stamens disappears; in others, it is easy to perceive the metamorphosis which they have undergone, as they retain something of their original forms. In double flowers the anthers usually disappear, which shows that the filaments have absorbed the nourishment. In double roses some stamens appear entirely changed, others retain something of their form, and others remain perfect. When all the stamens disappear, no perfect fruit is produced. On account of this degeneration of the stamens, cultivated flowers are not usually so good for botanical analysis as wild ones. The single flower exhibits the number of parts which nature has given to it. The rose in its native state has but five petals.

79. The *Anther* is supposed to be formed of the lamina of the leaf; it consists of cells containing minute particles, called *pollen*, which in the mature state of the flower is thrown out by the bursting of the cells. The lobes of the anther may be considered as formed by the two halves of the lamina of the leaf, the midrib being represented by the *connective*, and the margins by the suture, or line by which the lobes of the anther usually open. That part of the cellular tissue of the leaf next the cuticle is changed into a fibrous tissue, while the grains of pollen are transformed from the remainder of the tissue.

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78. Filament—*a.* Stamens changed to petals.—79. Structure of the anther

Fig. 83 represents a stamen with its filament *a*, its anther *b*, and the discharging pollen *c*. When the filament is wanting, the anthers are then said to be sessile, as at *d*, which represents a flower cut open, showing its stamens growing sessile in the throat.

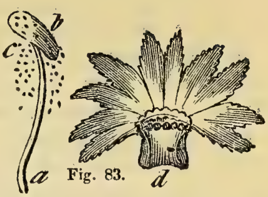

Fig. 83.

a. In the lily and proper grasses, the anther is fixed by its middle upon the apex of the filament, as upon an axis; it is then said to be *versatile;* when the base of the anther is firmly united with the summit of the filament, it is said to be *erect;* when it adheres by its back to the side of the filament, it is *adnate;* when it grows to the inside of the filament, or is turned inward, it is said to be *introrse;* when it is turned outward, *extrorse.*

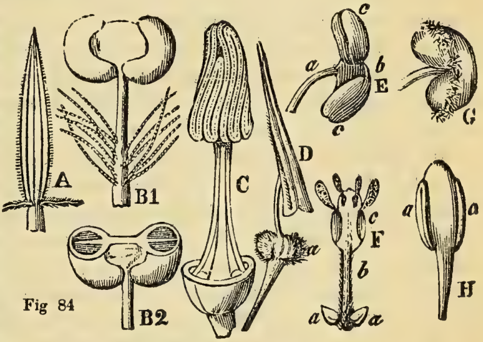

Fig 84

Fig. 84, A, represents a magnified stamen,* with a *lanceolate* anther, *denticulate* at the sides, with two hairy appendages; filament short. At B 1† the filament is bearded at the base; the anther is two-lobed, *reniform.* B 2 shows the two cells in each lobe, which is cut horizontally. At C,‡ the three filaments are distinct at the base, and connected at the upper part; anthers *adnate, linear, twisting.* At D,§ the anther is *sagittate*, the filament bent, and glandular in the middle (at *a*). At E,‖ the lobes of the anthers *c* are divergent; *a* is the filament, *b* the connective of the anthers. At F,¶ we see at *a*, cordate, pedicelled glands; *b*, pubescent filament; *c*, anther opening by four valves, throwing out pollen. At G,** the anthers are reniform, ciliate, opening transversely; lobes confluent at the summit, divergent at the base. At H,†† the filament is enlarged at the summit; the two lobes of the anther *a a*, adnate at the sides, parallel distant. In some cases the stamens are *exserted*, in the early stage of the flower, and in process of growth become included, as Geranium *striatum* (Fig. 85).

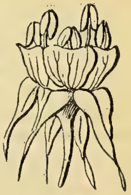

Fig. 85.

80. The PISTIL occupies the center or axis of the flower; it constitutes the inner whorl, and consists of one or more modified leaves, which are here called *carpels.* The analogy of carpels to leaves may be deduced from their similarity of texture, having stomata and glands, and from the ovules corresponding in situation to the germs or buds of leaves. According to the

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* Of the *Boraginaceæ* family.
† Of the *Tradescantia virginica.*
‡ Of the *Cucurbitaceæ* family.
§ Of the *Tiliaceæ* family.
‖ Of the *Labiatæ* family.
¶ Of the *Lauraciæ* family.
** Of the *Labiatæ* family.
†† Of the genus *Begonia.*

a. Position of the anther—Explain figures.—80 Structure of the pistil.

theory that pistils are transformed leaves, every thing relating to their form, situation, and structure, may be readily explained. The normal number of pistils is supposed to be the same as of each row of stamens, petals, &c., but pistils are more liable to have their original number lessened than any other organs of the flower; yet when a pistil seems solitary it will often be found that there are several cohering pistils, as in the lily, where three united pistils form one. The *stigma* is destitute of cuticle, and is the only organ of the plant in which this is wanting, except the spongioles of the root. The stigma communicates directly with the tissue of the pistil, and is in the living plant always moist or viscid. The ovules are attached to that line which represents the cohering margins of the leaf, and rest upon the seam or midrib. The *placenta* is a projection or point to which the ovules are attached. That part of the carpel where the placenta is formed is the *inner* or *ventral suture*, corresponding to the margin of the folded carpellary leaf, while the *outer* or *dorsal suture* corresponds to the midrib of the carpellary leaf. The pistil is essential to the continued existence of the plant; it varies in number in different plants, some having but one pistil, and others hundreds. Linnæus founded the orders of his first twelve classes on the number of these organs. When they are more than ten he did not rely upon their number, which in this case is found to vary in individuals of the same genus. The pistil usually consists of three parts—the *germ* (or ovary), *style*, and *stigma*. The ovary (Fig. 86, *a*) corresponding to the base of a pillar, the style (*b*) to the shaft, and the stigma (*e*) to the capital.

Fig. 86.

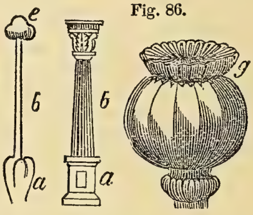


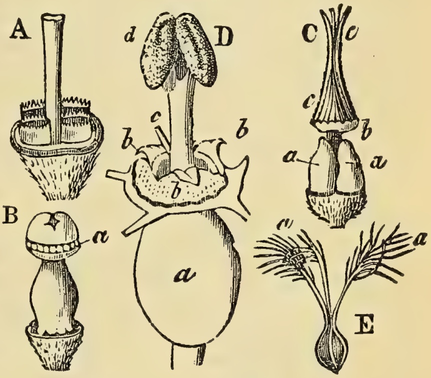
Fig. 86, *g*, represents the pistil of the poppy; the ovary is very large, the style is wanting, the stigma *sessile*, or placed immediately on the ovary. The style is not an essential part, but the stigma and ovary are never wanting; so that these two parts, as in the poppy, often constitute a pistil.

Ovary (or germ) is the inflated portion of the carpel (Fig. 86, *g*) which contains the ovules, or young seeds. In passing to maturity this organ undergoes a great change, as from the ovary of a small yellow blossom is formed the pumpkin and watermelon. When a pistil consists of a single carpel it is simple, and the terms pistil and carpel are then synonymous; several carpels united form a compound pistil and compound ovary. The ovary is said to be *superior* when placed above the calyx, as in the strawberry; *inferior* when below it, as in the apple. The figure of the ovary is roundish in some plants, cordate or angled in others. The *style* like the filament is

Ovary—Style.

sometimes wanting; when present it proceeds from the ovary, and bears the stigma on its summit; it is usually long and slender, of a cylindrical form, consisting of bundles of fibers, which transmit to the ovules, from the stigma, the fertilizing pollen. The *stigma* is the continuation of the cellular tissue in the center of the style. The stigma is always present; if the style be wanting it is placed upon the germ, and said to be *sessile*, as in the tulip. The stigma is various in size and form: sometimes it is a round head; sometimes hollow and gaping, more especially when the flower is in its highest perfection; it is generally downy, and always more or less moist, with a peculiar viscid fluid.

Fig. 87.

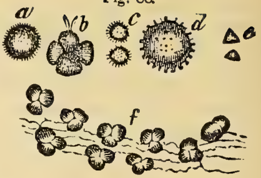


a. Fig. 87, A, represents the pistil of the Cynoglossum; style cylindric, stigma depressed or flattened at the top; four ovaries, containing rudiments of seeds. B represents the pistil of the Tournefortii, stigma hemispherical, sub-sessile, surrounded with a glandular hood. C represents the pistil of the Helitropium; *a*, four ovaries; *b*, a short style; *c*, a conical, four-parted stigma. D represents a pistil of the genus Cucumis; *a* is the ovary adhering to the calyx; *b*, three abortive stamens; *c*, cylindric style; *d*, three-lobed stigma; E, pistil of the genus Rumex; *a a*, plumose stigmas, with three carpels at the base.

81. The Pollen, which in most flowers is a kind of farina, or yellow dust, is thrown out by the bursting of the anther, which takes place in a certain stage of the flower. This discharge of pollen is owing to the formation of a tissue of fibers from the cellular lining; which fibers, by being coiled or interwoven, form minute springs that by their mechanical force open the anther and scatter the pollen. The pollen is very curiously formed; although appearing like little particles of dust, upon examining it with a microscope it is found to be composed of innumerable organized corpuscles. These, though usually yellow, are sometimes white, red, blue, &c. They are *oblong* in the Umbelliferous plants, *globular* in the Syngenesious, and *triangular* in some others. In some their surface is smooth, in others armed with little points. They are connected together by minute threads, as in the honeysuckle, &c. These particles of pollen when placed upon water swell with the moisture until they burst; a liquid matter is then thrown out, and, expanding upon the surface of the water, appears like a light cloud.

Stigma—*a.* Explain Fig. 87.—81. Pollen.

Fig. 88



a. Fig. 88 represents, as seen under a magnifier, at *a*, a grain of pollen of one of the Mallows-like plants; it is globular, hispid; at *b* the grain of pollen is four-lobed; this belongs to the Orchis family; at *c* is the pollen of the Aster; at *d* is the pollen of the Hibiscus, globular, muricated; at *e* is the pollen of the Nasturtium, angular. At *f* is the three-lobed pollen of the honeysuckle.

b. When the pollen bursts the anther it is scattered, and coming in contact with the moist stigma is absorbed, and passes through minute tubes into the ovary; here are the *ovules* formed, but they require the agency of the pollen to bring them to the perfection necessary for reproducing their species. We perceive why the stamens and pistils are so essential to the perfection of a plant. Nature does not form a beautiful flower, and then leave it to perish without any provision for a future plant, but in every vegetable provides for the renewal of the same.

c. The real use of stamens and pistils was long a subject of dispute among philosophers, till Linnæus explained it beyond a possibility of doubt. These organs have from the most remote antiquity been considered of great importance in perfecting the fruit. The Date palm, which was cultivated by the ancients, bears stamens and pistils on separate trees; the Greeks discovered that, in order to have good fruit, it was necessary to plant the two kinds of trees near together, and that without this assistance the dates had no kernel, and were not good for food. In the East, at the present day, those who cultivate palms select trees with pistillate flowers, as these alone bear fruit. When the plant is in blossom, the peasants gather branches of the wild palm-trees with staminate flowers, and strew the pollen over their cultivated trees.

d. Pistillate flowers are called *fertile;* staminate, *infertile* flowers. As moisture causes the pollen to explode, rains and heavy dews are sometimes injurious to plants; the farmer fears wet weather while his corn is in blossom. Nature has kindly ordered that most flowers should either fold their petals together, or hang down their heads when the sun does not shine; thus protecting the pollen from injury. The fertilization of the fig is said to be accomplished by insects. In this singular plant the fruit incloses the flower; it is at first a hollow receptacle, lined with many flowers, seldom both stamens and pistils in the same fig. This receptacle has a small opening at the summit. The seeds are fertilized by certain little flies fluttering from one fig to the other, and thus carrying the pollen from the staminate to the pistillate flowers. Although the fertilization of plants, where the stamens and pistils are on separate flowers, depends a little upon chance, the favorable chances are so numerous that it is hardly possible, in the order of nature, that a pistillate plant should remain unfertilized. The particles of the pollen are light and abundant, and the butterflies, honey-bees, and other insects transport them from flower to flower. The winds also assist in executing the designs of nature The pollen of the Pines and Firs, moved by winds, may be seen rising like a cloud above the forests; the particles being disseminated, fall upon the pistillate flowers

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a. **Describe the figure—*b.* Use of the pollen in the vegetable economy—*c.* Real use of the stamens and pistils unknown till the time of Linnæus—Cultivation of plants in the East—*d.* Fertile and infertile flowers—Fertilization of the fig—Various methods by which nature conveys pollen to the pistillate plants.**

and rolling within their scaly envelopes, fertilize the ovaries. A curious fact is stated by an Italian writer, viz., that in places about forty miles distant grew two palm-trees, the one without stamens, the other without pistils; neither of them bore seed for many years; but in process of time they grew so tall as to tower above all the objects near them. The wind, thus meeting with no obstruction, wafted the pollen to the pistillate flowers, which, to the astonishment of all, began to produce fruit.

e. The number of plants in which the pistils and stamens are on different flowers is few compared to those which have these important organs inclosed within the same corolla; as in our herbaceous plants, and the trees of hot countries, whose leaves being always present might impede the passage of the pollen from other trees. On the contrary, the trees of cold climates have generally the stamens and pistils on separate flowers, blossoming before the leaves come forth, and in a windy season of the year. Those which blossom later, as the oak, are either peculiarly frequented by insects, or like the numerous kinds of firs, have leaves so little in the way, and pollen so excessively abundant, that it can scarcely fail of gaining access to the pistillate flower. In all cases the pollen and stigma are in perfection at the same time; in those flowers where the stamens and pistils are together, and of an equal length, some are drooping and some erect; but where the stamens are longer than the pistil, the flower is usually erect; where they are shorter, the flower is pendent: nature thus provides for the fertilization of the germ by the fall of the farina upon the stigma.

Fig. 89, at A, represents a monœcious flower of the genus Euphorbia.* In the center of the perianth, *a*, is the *infertile* flower, consisting of several double stamens, *c c*, upon jointed filaments, *dd*; *b* is the *fertile* flower, with a petal-like stigma. At B, the same flower before blossoming is represented as cut vertically, to show its internal structure at this period. C shows the same flower after its fertilization. Before the maturity of the blossom the pistil was above the stamens, as seen at B. At the expansion of the perianth it was below the stamens, as at A *b*;—resuming its erect position, we see the pistil at C, its ovary having become a fruit filled with swelling seeds.

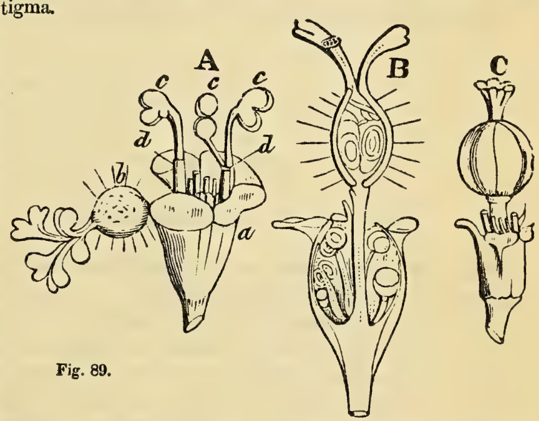

Fig. 89.

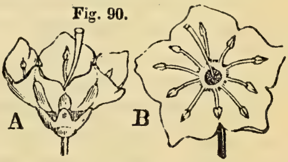

Fig. 90.

In the laurel (Kalmia) the ten stamens are confined by their anthers in ten cavities of the five-parted, monopetalous corolla. When the flower is mature, the anthers suddenly spring from their confinement, and scatter their pollen upon the stigma. Fig. 90, at A, represents the flower as it appears before its perfect expansion; at B, after that period.

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* EUPHORBIA *illyrica.*—Mirbel.

Facts stated by an Italian writer—*e.* Trees of hot countries have mostly stamens and pistils on the same corolla—Trees of cold countries have the stamens and pistils on separate flowers—Methods by which the objects of nature are accomplished—Explain Fig. 89—Explain Fig. 90.

Interesting as is the subject of the various means contrived by Providence for the continuation of the vegetable tribes, the limits of our work will not permit us to extend our inquiries in this department of our science. But if there are any who hold Botany to be a trifling science, let them examine into the grand principles which it develops, unfolding to the view of man the workings of Creative wisdom in one vast domain of nature. The greatest Botanist, in the midst of his discoveries, must experience a feeling of humiliation at his own ignorance of nature. Facts which, when discovered, seem so simple that we wonder a child should not have discovered them, have eluded the research of the wisest men;—and at this moment, we doubt not, philosophers are groping for truths, which in due time will be elicited and incorporated into the elements of science, to be learned and understood by children.

LECTURE XIV.

INFLORESCENCE.

82. THE arrangement of flowers upon their axis, or the branching out of the *floral axis*, is called INFLORESCENCE or *anthotaxis* (from *anthos*, flower, and *taxis*, order). Flower-buds, like leaf-buds, are produced in the axils of leaves which are called floral leaves or bracts. When the flower is forming, there is an expansion horizontally while the perpendicular growth is checked. In respect to the development of flowers, two divisions have been made, viz., the *centripetal* and *centrifugal* inflorescence; in the *centripetal*, the blossoming commences with the *flower of the circumference* or *base*, and proceeds toward the center, or summit, as in the carrot and cabbage; in the *centrifugal*, the *central flowers* open first, and the lower or external ones last, as in the pink. In these cases the bud which terminates the stem is transformed into a flower, and being the earliest formed, is the first to expand. The stem itself cannot elongate further, but new branches are developed in the axils of the bracts or upper leaves by the accumulation of nourishment. These are terminated by a solitary flower which again produces branches from the axils of its bracts in the same man-

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Reflection.—82. Inflorescence—Centripetal and centrifugal.

ner; the flowers developing in the order of their age, beginning at the center.

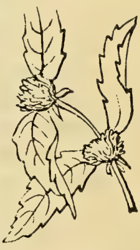
83. We will consider the flower, with *respect to the organs which it contains;* to the *branches which support it;* and the *flowers which are near it, or grow on the same peduncle.*

When the corolla is monopetalous it supports the stamens: when it is polypetalous the stamens are inserted upon the calyx or upon the receptacle, and their number is then usually double the number of petals, as in the pink, which has ten stamens and five petals. When inserted *beneath* the ovary or base of the pistil, the corolla is said to be *hypogynous* (underneath the style, or inferior), as in the *stramonium.* When it is inserted into the calyx and *surrounds* the ovary, as in the currant, it is said to be *perigynous* (around the style, or enveloping it). When the corolla is inserted *upon* the ovary, as in the trumpet-honeysuckle, it is said to be *epigynous*, or superior.

a. The disposition of flowers upon their branches is analogous to that of leaves; thus, flowers are either *radical*, coming from the root, or *cauline*, coming from the stem; they are *peduncled* or *sessile*, *solitary*, *scattered*, or *opposite*, *alternate* or *axillary.* They are *unilateral*, growing on one side of the branch; or fixed equally upon all parts of the peduncle and pointing in different directions.

b. The different modes of division of the common peduncle into lesser peduncles or supports cause a great difference in the appearance and situation of flowers, and exhibit a variety of forms of inflorescence. The green part which comes from the stem and supports the flower is called the *peduncle*, or footstalk. The divisions of the peduncle are called *pedicels.* When the *lateral* buds of a flower-branch become flowers without forming pedicels, a *spike* is the result. The axis of the spike continues to lengthen, producing new flowers at its summit, arising from *lateral* buds; this is called *indefinite* or *indeterminate* inflorescence. But when the *bud at the summit of the branch* becomes a flower, the inflorescence is said to be *definite* or *determinate.*

Fig. 91.



When the plant is one-flowered, the flower is usually inserted at the end of the stem; the peduncle in that case is scarcely distinct from the stem.

84. *Verticillaster* (from *verticillus*, a kind of screw), or *whorl.* A whorl in botany signifies a circle, or ring, and the term is now usually applied to leaves, and the different whorls of the organs which compose

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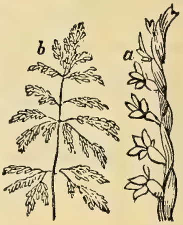
83. Flower considered under three aspects—What is said of the corolla with respect to other organs of the flower?—*a.* What is said of the flower with respect to the branches which support it?—*b.* With respect to the divisions of the stem which support the flower?—84. Verticillaster or whorl the flower. Fig. 91 (Lamium, of the family Labiatæ) represents a verticillaster, or whorl. A circle of flowers produced at the axils of leaves, was formerly termed a whorl; but as the central flowers are found to expand first, or to be centrifugal, this mode of inflorescence is now considered as *cymose*, the flowers being sessile, or nearly so, and the clusters are called *verticillasters*. Yet as the term whorl or whorled has been by former botanists used in descriptions of plants, we shall retain the same in its usual acceptation.

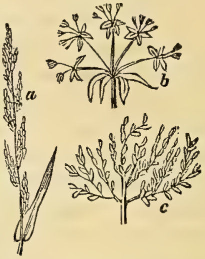
Fig. 92.



Raceme (Fig. 92, *a*) consists of numerous flowers or pedicels, and all arranged on one common peduncle, as in the locust and currant. The only difference between a raceme and a spike is, that in the latter the flowers are more densely inclosed with very short pedicels or none.

Panicle (Fig. 92, *b*) bears flower-branches in the place of simple flowers. In this case the secondary floral axis, or *rachis*, gives rise to tertiary ones, as in some of the grasses and the oat. If the peduncles in the middle of a dense panicle are longer than those at the extremities, a *thyrse* is produced, as the lilac and grape, where the panicle is contracted into a somewhat ovate form.

Fig. 93.



Spike (Fig. 93, *a*) is an assemblage of flowers arising from the sides of a common stem; the flowers are sessile, or with very short peduncles, as some of the grasses and mullein. A spike is generally erect. The lowest flowers usually blossom and fade before the upper ones expand, or the expansion is from base to apex. When the flowers in a spike are crowded very close, an *ear* is formed, as in *Indian corn.*

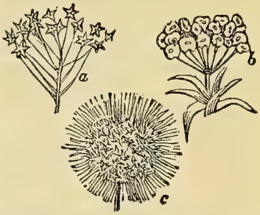
Umbel (Fig. 93, *b*) consists of several flower-stalks, of nearly equal length, spreading out from a common center, like the rays of an umbrella, bearing flowers on their summits, as in the carrot. If the secondary axes or rays arise from the primary ones in the same manner, a *compound* umbel is formed, as in the parsnip. A compound umbel bears the same relation to a panicle that a simple umbel does to a raceme.

Cyme (Fig. 93, *c*) resembles an umbel in having its common stalks all spring from one center, but differs from it in having those stalks irregularly subdivided; as the snowball and elder. The order of development of these flowers is centrifugal. A cyme reduced to a few flowers, is called a *verticillaster;* crowd-

Raceme—Panicle—Spike—Umbel—Cyme.

ed cymes in the axils of a pair of opposite leaves, as in the Labiate plants, have been called *verticils* or *whorls*. A cyme with its flowers nearly sessile, is called a *glomerale*.

Fig. 94.

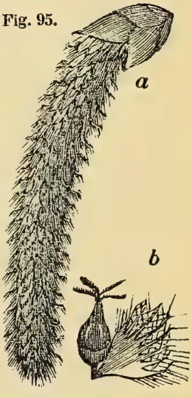


Corymb (Fig. 94, *a*), or false umbel; here the peduncles rise from different hights above the main stem, but the lower ones being longer, they form nearly a level or convex top; as the yarrow. The centrifugal evolution of the blossoms distinguishes the cyme, while in the corymb the evolution is centripetal.

Fascicle (Fig. 94, *b*) has flowers on little stalks variously inserted and subdivided, and collected into a close bundle nearly level at the top; as the sweet-william. It is more compact than the cyme.

Head, or capitalum (Fig. 94, *c*), has sessile flowers heaped together in a globular form; as in the clover, and button-bush (*Cephalanthus*). It may be considered either a simple umbel with sessile flowers, or a spike with a very short axis. The axis or *rachis* of a head is called the receptacle. The whole inflorescence is the product of one branch; the lower flowers expand and often bear fruit, while the upper are in bud and the middle in full bloom; the inflorescence is centripetal, or from the circumference.

Fig. 95.



Ament, or catkin, is an assemblage of flowers, composed of scales, and stamens or pistils, arranged along a common thread-like receptacle, or *rachis*, as in the chestnut and willow. The scales of the ament are properly the calyces; the whole aggregate, including scales, stamens or pistils, and filiform axis, constitutes the ament. At Fig. 95 is the representation of the *pistillate* ament of the poplar; it is oblong, loosely imbricated, and cylindrical; the calyx is a flat scale, deeply fringed. At *b* is a representation of the fertile or pistillate flower; the calyx or bract is a little below the corolla, which is cup-shaped, of one petal, and crowned with an egg-shaped, pointed ovary, which is superior, and bears four (sometimes eight) stigmas.

The *staminate ament* resembles the pistillate, except that its corolla incloses eight stamens, but no pistil. The poplar is in the class Diœcia, because the pistillate and staminate flowers

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Corymb—Fascicle—Head—Ament.

are on different trees; and of the order Octandria, because its barren flowers have eight stamens.

The *Spadix* is an assemblage of flowers growing upon a common axis, and surrounded by a spatha or sheath.

Fig. 96.

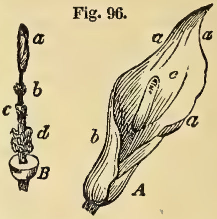
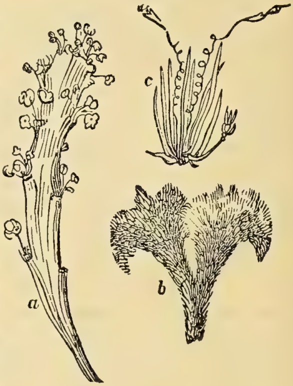


Fig. 96, A, *a*, represents the blossom of the wild turnip (*arum*); *a*, the spatha, which is erect, sheathing, oblong, convolute at the base, and compressed above and below the middle, *b; c* represents the spadix, which, from its club-shaped appearance, is called *clavi-form* (from *clava*, a club).

At B is the spadix divested of the spatha; *a* is the clavi-form summit; *b*, a ring of filaments without anthers; *c*, a ring of sessile anthers; *d*, a dense ring of pistillate flowers with sessile stigmas; each ovary produces a one-celled globular berry. This plant is of the class Monœcia, because its staminate and pistillate flowers are separate, but yet grow on the same plant; it is in the order Polyandria, because its stamens are numerous.

Fig. 97.



a. The *floral axis* sometimes assumes a leaf-like or *phylloid* appearance (from *phyllon*, a leaf, and *eidos*, form), as in Xylophylla, Fig. 97, *a*, where the clusters of flowers are developed in a centrifugal or cymose manner; sometimes a flattened peduncle composed of adhesions of several peduncles, forms a crested summit covered with pointed bracts, and supporting flowers as in the cockscomb (Celosia, Fig. 97, *b*); in the Vallisneria, *spiralis* (Fig. 97, *c*), the flowers standing on spiral peduncles are by their uncoiling raised to the surface of the water previous to their becoming fertilized. The different kinds of inflorescence are chiefly determined by the elongation or shortening of the axis, and the presence or absence of pedicels or stalks to the flowers. Thus, a spike is a raceme in which the flowers are not stalked; the umbel is a raceme in which the primary axis is shortened; the head is a spike in which the same shortening has taken place. The centrifugal and centripetal modes of inflorescence are sometimes combined in the same plant; in some *compound* flowers the *heads* of flowers taken as a whole are developed *centrifugally*, the terminal head first; while the *florets*, or small flowers on the receptacle, open *centripetally*, those of the circumference first.

85. The RECEPTACLE is the termination of the floral axis, the summit of the peduncle upon which the flowers expand; it is not in reality a proper organ, though from the importance of this point of the stem it is spoken of as such. The summit of the peduncle is usually somewhat enlarged, to allow the development of the envelopes. When it forms a fleshy ring surrounding the base of the carpels, as in the orange, it is called a *disk*. The receptacle is also called the *clinanthe* (from *kline*, bed, and *anthos*, flower), and sometimes the *torus* (from the Latin, signifying bed). In simple flowers, as the tulip, the receptacle is scarce-

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Spadix—Various appearances of the floral axis.—85. What is the receptacle?—Different names of the receptacle.

ly to be distinguished from the peduncle; but in compound flowers it is expanded, and furnishes a support for the flowers and fruit. Receptacles are of various kinds, as: *Proper*, which supports but one flower, as in the violet and lily. *Common*, which supports many florets, the assemblage of which forms an aggregate or compound flower, as in the sunflower and dandelion. The common receptacle presents a great variety of forms, as, *concave*, *convex*, *flat*, *conical*, or *spherical*. In the fig it is concave, and constitutes the fruit. As to its surface, the receptacle is *punctate*, as in the daisy; *hairy*, as in the thistle; *naked*, as in the dandelion; *chaffy*, as in the chamomile. It is pulpy in the strawberry, but dry in most plants. *Rachis* is the filiform receptacle which connects the florets in a spike, as in a head of wheat.

We shall, in our next lecture, proceed to consider the change which takes place after the bloom and beauty of the plant have faded. We shall find organs, at first scarcely perceptible, beginning to develop themselves, until the character of the fruit is fully exhibited. So, in the heart of youth, the germs of virtue or vice may, for a while, be apparently dormant and inactive, but growing more vigorous and powerful, they at length unfold themselves, and reveal either a character matured into what is lovely and desirable, or marked with qualities of a disagreeable and deleterious nature.

LECTURE XV.

THE FRUIT.—PERICARP.—PARTS OF THE PERICARP.—MIRBEL S CLASSIFICATION OF FRUITS.

The Fruit.

86. The fruit is composed of two principal parts, the *pericarp* and *seed*. The term pericarp (from *peri*, around, *karpos*, fruit) signifies, surrounding the seed. All, in any fruit, which is not the seed, belongs to the pericarp.

Let us now inquire into the progress of the fruit from its first appearance in the germ to its mature state. On cutting the ovary horizontally, we see minute bodies of a pale-green color and an apparently homogeneous nature: each of these is called an *ovule*. These ovules, before the fertilization of the germ by the pollen, are scarcely perceptible; after this period, and the fading of the corolla, the ovules increase in size, and the embryo and other parts which constitute the seed become manifest. *The ovary enlarges with the growth of the ovules;* the use of this covering is not confined to the mere protection of the seeds

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What is the proper receptacle?—What the common?—What is the rachis?—Reflection.—86. **Fruit** the two principal parts—Derivation and signification of the word pericarp—Ovary—Ovules.

from injury, but it is furnished with glands, which secrete such juices as are necessary for the growth and development of the ovules.

The pistil in its simplest state consists of a carpel, or folded leaf, with ovules at its margin; in the fruit the pericarp represents the carpellary leaf, and the seed the ovules. The transformation of a leaf into a pistil is not more remarkable than the metamorphosis of a pistil into a fruit. *As the ovary becomes mature it takes the name of pericarp*, and in its growth becomes either woody or pulpy fruit. Pulpy fruits absorb oxygen gas, and throw off carbonic acid: saccharine or sweet juices are elaborated in their cellular integument. In another stage, the pulpy substance passes through a slight fermentation, the organization is disturbed, the juices sour, the pulp decomposes, and putrefaction ensues. Such is the change which takes place in pulpy fruits during their progress toward maturity and subsequent decay.

87. The ovary being fertilized, the parts of the flower which are not necessary for the growth of the fruit, usually fade, and either fall off or wither away. The *pericarp and seed* continue to enlarge until they arrive at perfection.

The pericarp often includes other parts of the flower besides the ovary, as the fruit of the hazel and oak consists of the ovary, bracts, and calyx united; the apple and pear, of the ovary and calyx; that of the pineapple, of the ovaries and floral envelopes of several flowers combined. Every kind of fruit we see, has been once the ovary or base of the pistil. The term fruit, in common language, is limited to pulpy fruits which are proper for food; but in a botanical sense, the fruit includes the seeds and pericarps of all vegetables. The size of fruit is not usually proportioned to that of the vegetable which produced it. The pumpkin and gourd grow upon slender herbaceous plants, while the large oak produces but an acorn. The variety in the colors of fruits is supposed to be owing to certain changes of the *chromule*, analogous to the phenomena in the change of colors in leaves before their decay.

a. In some fruits the pericarp consists of the *epicarp*, the skin of the fruit, or membraneous part which surrounds it, and which is a kind of epidermis; the *sarcocarp*, or *mesocarp*, a part more or less fleshy, corky, or coriaceous, often scarcely perceptible, and covered by the epicarp; the *endocarp*, an internal membrane of the fruit, which lines the cavity, and by its folds forms the partitions and cells. In the peach, for example, the skin is the *epicarp;* the pulpy cellular substance which absorbs the juices of the fruit, the *sarcocarp;* the shell which incloses the kernel, deprived of moisture, and rendered dry and tough, is the *endocarp*. The endocarp is also called the *putamen*.

Fig. 98 represents a portion of the carpel or legume of the bean, cut transversely to show the structure of the pericarp: *e*, *epicarp*, or external epidermis, corresponding to the lower

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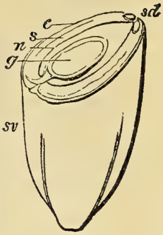
Use of the Ovary—Its name in a mature state—Pulpy pericarps.—87. Perfecting of the pericarp and seed—Organs sometimes included in pericarps, &c.—Color of fruits—*a.* Epicarp—Sarcocarp—Endocarp

Fig. 98.



epidermis of the leaf; *s*, *sarcocarp*, the middle, representing the parenchyma of the leaf; *n*, *endocarp*, equivalent to the upper epidermis of the leaf; *s d* represents the *dorsal suture; s v*, the ventral suture; *g*, a seed. In the cherry and plum, the sarcocarp is the part of the fruit which is eaten. In the almond the seed or putamen is used as fruit, while its leathery covering, or sarcocarp, and the hard epicarp, are rejected. The pulpy matter found in the grape and gooseberry is formed from the placenta, and is not the sarcocarp.

b. The *external pieces*, which form the sides of the seed-vessels, are called valves. If a pericarp is formed of but one valve, it is *univalved;* the chestnut is of this kind. A pericarp with two valves is said to be *bivalved*, as a pea-pod. The pericarp of the violet is *trivalved;* that of the stramonium *quadrivalved.* Most valves separate easily when the fruit is ripe; this separation is known by the term *dehiscence. Sutures*, or *seams*, are lines which show the union of valves; at these seams the valves separate in the mature stage of the plant: they are very distinct in the pea-pod, which has two sutures. *Partitions*, or *dissepiments*, are internal membranes which divide the pericarp into different cells: these are *longitudinal* when they extend from the base to the summit of the pericarp; they are *transverse* when they extend from one side to the other. *Column*, or *columella*, is the axis of the fruit; this is the central point of union of the partitions of seed-vessels; it may be seen distinctly in the core of an apple. *Cells* are divisions made by the dissepiments, and contain the seeds; their number is seldom variable in the same genus of plants, and therefore serves as an important generic distinction. *Receptacle* of the fruit is that part of the pericarp to which the seed remains attached until its perfect maturity; this organ, by means of connecting fibers, conveys to the seed, for its nourishment, juices elaborated by the pericarp. Some plants are destitute of a pericarp, as in the labiate flowers, compound flowers, and grasses; in these cases the seeds lie in the bottom of the calyx, which performs the office of a pericarp.

Classification of Fruits.

88. "The most scientific and natural method of classing fruits," says Mirbel, "would be to distribute them according to the *vascular structure* of pericarps and seeds, employing as *secondary* characters only the *succulence* or *dryness* of the tissue, or the indehiscence of pericarps. The student would then perceive that the fruits

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b. Valves—Sutures—Partitions or dissepiments—Column—Cells—Receptacle of the fruit—Pericarp sometimes wanting.—88 Remarks from Mirbel respecting the classification of fruits.

in one family of plants are often formed upon a model which can admit of *exterior modifications*, and still preserve unaltered the essential characters of the *internal structure*. But the actual state of science does not warrant a classification founded on characters so important but so obscure, and better fitted to enlighten the learned Physiologist than to assist the student in Descriptive Botany."* Mirbel has given a simple arrangement of fruits, which, in its essential features, we shall follow.

a. Phenogamous plants, in respect to their fruits, are divided into two classes 1st, *Gymnocarpes*, which include all such as are not masked, or covered by any organ which conceals their true character. 2d, *Angiocarpes*, which include all fruits covered by any organ which disguises them from observation.

89. *Synopsis of Mirbel's Orders and Genera of Pericarps.*

CLASS I.

Gymnocarpes—*fruit naked*, or pericarps without foliaceous envelopes.

Order 1. **Carcerulares**, simple fruits, remaining closed.

Genera,	1. Cypsela ;	Ex., *dandelion.*
	2. Cerion ;	" *corn, wheat.*
	3. Carcerula ;	" *buckwheat, elm.*

Order 2. **Capsulares**, simple fruits, which open at maturity.

Genera,	1. Capsule ;	Ex., *pink, lily, poppy.*
	2. Legume ;	" *bean, pea.*
	3. Silique and Silicle ;	" *mustard, wall-flower.*
	4. Pyxides ;	" *carrot.*

Order 3. **Dieresilia**, simple fruits, which divide into many parts when ripe.

Genera,	1. Cremocarp ;	Ex., *coriander.*
	2. Regmates ;	" *euphorbia, althea.*
	3. Dieresil ;	" *galium.*

Order 4. **Etaironnair**, compound fruits, proceeding from an ovary to which the style adheres.

Genera,	1. Follicle ;	Ex. *asclepias.*
	2. Etairon ;	" *ranunculus, larkspur.*

Order 5. **Cenobionnaires**, compound fruits, proceeding from an ovary not bearing the style.

Genera,	Cenobium ;	Ex., *sage, borage.*

Order 6. **Drupaces**, simple fruits, contained in a nut.

Genera,	Drupe ;	Ex., *cherry, almond, cocoanut.*

Order 7. **Baccati**, simple, succulent fruits, containing many separate seeds.

Genera,	1. Pyridion ;	Ex., *apple, pear.*
	2. Pepo ;	" *cucumber family.*
	3. Bacca ;	" *asparagus, coffee, whortleberry*

CLASS II.

Angiocarpes—*fruits covered* by bracts or foliaceous envelopes.

No Division of Order.

Genera,	1. Calybion ;	Ex., *chestnut.*
	2. Strobilum ;	" *pine, cedar, hop.*
	3. Sycone ;	" *fig.*
	4. Sorose ;	" *mulberry, pineapple*

CLASS I. GYMNOCARPES.

Fruits not covered by any bracts or foliaceous envelopes.

90. **Order** 1st. **Carcerulares** (from *carcer*, a prison), simple fruits, without valves, and which never open spontaneously. This order includes the fruits of *Syngenesious plants*, of the *grasses*, &c.

1st. *Cypsela* (or achænium; from *kupsele*, a box). This pericarp is one-celled, one-seeded, adhering; the seed is erect, with the radicle pointing to the hilum; it is *monocephalous*, and crowned by the border of the calyx, prolonged in scales, or an egret. It is woody, membraneous, or succulent. This fruit is found in Syngenesious

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* Translated from *Elemens de Physiologie végétale et de Botanique. Par* C. F. Brisseau Mirbel, *de l'Institute de France.*

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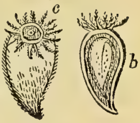
a. Into what two classes has Mirbel divided fruits?—89. Synopsis of Mirbel's classes, orders, and genera of fruits.—90. Describe the order Carcerulares, with the genera here found

Fig. 99



plants; it is turbinate (Fig. 99, *a*). Its surface is pubescent and furrowed; *indehiscent*, *monospermous;* the egret (*c*) is *sessile* and *plumose*, and the embryo is *dicotyledonous* and fleshy. It is attached to the pericarp by the *podosperm.* At *b* is represented this pericarp cut longitudinally, and exposing an inner half of one of the cotyledons. In this genus are the pericarps of the dandelion, the salsify or oyster-plant, lettuce, &c. 2d. *Cerion* (*Caryopsis*, kernel); in this genus the embryo is situated upon the side of the perisperm, or albumen; cotyledon one, large and fleshy. The ovary is clothed with a *pileole ;** the radicles are contained in *coleorhizes.* It is subrotund, as Indian corn; oblong, as wheat; rostrate, as in some of the grasses. 3d. *Carcerula* (including what some call the *utricle*, others the *samara*); the characters of this genus are variable; it includes all fruits of the order *Carcerulares*, which do not come within the two preceding genera; the buckwheat, elm, and rhubarb are examples.

91. Order 2d. Capsulares, simple fruits, having capsules which open when in a mature state; they have their origin from a single ovary, free, or adhering to the calyx; they have valves, and consequently sutures, and open by the separation of the valves. 1st. *Capsule* signifies a little chest or casket; it is a hollow pericarp, which opens spontaneously by pores, as the poppy, or by valves, as the pink. The internal divisions of the capsule are called *cells;* these are the chambers appropriated for the reception of the seeds; according to the number of these cells, the capsule is *one-celled, two-celled*, &c. The membranes by which the capsule is divided into cells, are called *dissepiments*, or partitions; these partitions are either parallel to the valves, or contrary. The *columella* is the central pillar in a capsule, and is the part which connects the several internal partitions with the seed; it takes its rise from the receptacle, and has the seed fixed to it on all its sides. In one-celled capsules the columella is wanting. Fig. 100 represents a capsular fruit; it is the seed of the martagon-lily (*Lilium martagon*); *a* represents the capsule open, as it appears in a mature state; *b*, the same cut transversely, showing the seeds. All capsular fruits which do not belong to the other genera in this order, are here included. They are monocephalous, as in the lily; or polycephalous, as in Nigella. 2d. The *Legume* is an irregular, bivalve, elongated pericarp; it is monocephalous and free; the two valves joined by two sutures, an upper and lower; the seeds are attached only to one suture or seam, as in the pea. In this circumstance it differs from the silique, which has its seeds attached to both sutures; it contains seeds in one cell, a placenta along the lower suture. The embryo has two cotyledons; the radicle is attached to the hilum. The legume is saber-form in the bean, cylindric in the Cassia, compound in the pea, and articulated in Hedysarum, where it is called a *loment.* The word *pod* is used in common language for both these species of pericarp. Plants which produce the legume, are called *leguminous.* The greater number of these plants are in the class *Diadelphia.* The tamarind is a legume filled with pulp, in which the seeds are lodged. Fig. 101, *a*, represents the fruit of the *Astragalus;* cell inflated, longitudinal; at *b* is the same legume cut transversely, to show the two cells. 3d. The *Silique* is a bivalved pericarp, peculiar to the *Cruciferæ;* it is divided by a longitudinal partition, formed by the dilated placenta, and bearing the seeds, which are attached alternately to its opposite edge, as in the mustard and radish. The proper silique is two-celled, being furnished with a partition which runs the whole length of this kind of pericarp; there are some exceptions to this, as in the celandine. The *Silicle* (*Silicula*, a little pod) is distinguished by being shorter than the silique, as in the pepper-grass.

Fig. 100.

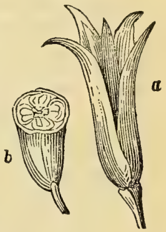
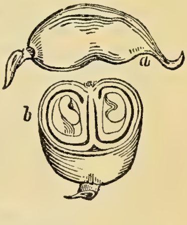


Fig. 101.



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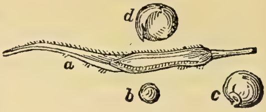
* For an illustration of these terms see plate 121, with its explanation.

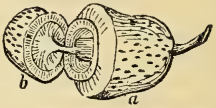
91. Order Capsulares, with its genera.

Fig. 102.



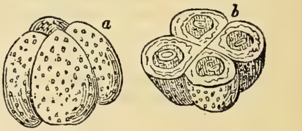
This difference in the form of the silique and silicle is the foundation of the distinction in the orders of the class Tetradynamia. Fig. 102, *a*, represents a *silique*, the fruit of the SINAPIS *alba* (white mustard); it is *rostrate;* *b* represents a globular seed; *c*, the same magnified; *d* shows the seed separating, and the embryo making its appearance. 4th. The *Pyxides* (from *puxis*, a box) have two valves, an upper and lower; the latter is attached to the receptacle, while the former opens like the lid of a box, as seen in *Lecythis.* Fig. 103, *a*, represents the lower valve; *b*, the upper valve or lid of the pericarp. To this genus belong the fruit of the Anagalis, Hyosciamus, and Gomphrena globosa, or bachelor's button.

Fig. 103.



92. ORDER 3d. DIERESILIA (from *diæresis*, divison) contains simple fruits, which divide into many carpels ranged symmetrically round a central axis. These carpels are formed by the adhering valves of the pericarp which in the maturity of the fruit separates, and the carpels appear like so many little nuts; as in the seed of the nasturtion, which easily falls into parts. 1st. *Cremocarp* (from *kremao*, to suspend, and *karpos*, fruit); this kind of fruit derives its origin from an ovary surmounted with two styles, and often crowned by the limb of the calyx. It has two cells and two seeds. It divides itself into two seeds, suspended by their summit to a slender central axis, usually two-forked. Each seed contains a depending embryo, clothed with a membraneous and adhering tegmen, and having a horny perisperm. The embryo is very small, and has two cotyledons. The coriander is a *spherical cremocarp;* the caraway is *ellipsoid.* The seeds of the carrot and parsley and other *umbelliferous* plants belong to this genus. 2d. The *Regmates* (from *regma*, opening with noise) contain many seeds which are inclosed by two valves opening by an elastic movement, as Euphorbia. Fig. 104 represents a pericarp of the Euphorbia, consisting of four carpels;—in the ripe fruit, the *panextern*, or outer covering, is thrown off by an elastic movement of the valves; *a* represents the entire fruit, and *b* the same cut transversely, showing the four seeds. 3d. *Dieresil*,* a variable genus, contains such fruits in the order as do not properly come under the two other divisions, as the nasturtion, geranium, hollyhock, &c.

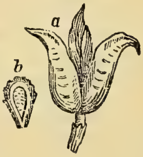
Fig. 104.



93. ORDER 4th. ETAIRONNAIRES (from *etairoi*, associates) contain compound fruits proceeding from ovaries bearing the styles; this order has two genera. These fruits offer many irregular pericarps which do not adhere to the calyx. The Capsular fruits show the commencement of the separation of cells; the Dieresilian fruits show this separation complete in the pericarp divided into many nuts after coming to maturity; the fruits of the Etaironnair order show this separation from the earliest stage of the pistil. There is a gradual passing from one order to another, showing the existence of natural relations under the great diversity of forms. 1st. *Follicle* is a one-valved pericarp opening longitudinally on one side and having its seed loose within, or not affixed to the suture, as in the dog's-bane (Apocynum), which has a *double follicle*, and in the milk-weed (Asclepias). 2d. *Etairon*,† having many seeds ranged round the imaginary axis of the flower, as the ranunculus and anemone.

Fig. 105 represents the fruit of the *Aconitum* (monk's-hood); it is composed of *three pods* united in one compound fruit; *a* shows one of the valves in a dehiscent state; *b* represents a seed cut longitudinally. The *Clematis* is a *caudate etairon;* the *Pæonia* is divergent and dehiscent.

Fig. 105.



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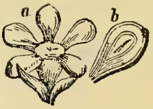
* The *samara* of Gærtner. † The *syncarp* of Richard.

92. Order Dieresilia, with its genera.—93. Order Etaironnaires, with its genera.

94. Order 5th. Cenobionnaires (from *koinobion*, a community), compound fruits without valves or sutures, proceeding from ovaries without any adhering styles; this order contains but one genus. 1st. *Cenobion* includes fruit of the labiate plants and some others. Fig. 106 represents the pericarp of the genus *Gomphia;* it is composed of five *companions, a,* as Mirbel calls each of the one-celled divisions which stand around an ovoid pericarp; *b* represents one of these divisions cut vertically, containing one seed.

Fig. 106.



95. Order 6th. Drupaces, simple fruits, containing a nut. This order has but one genus. 1st. The *Drupe* is composed of a woody or bony *panintern,*[*] called the nut, and of a *panextern,*[*] sometimes dry and membraneous, at others fleshy or pulpy. It may be regular or irregular, monocephalous or polycephalous, adhering to the calyx, or free. The cherry has a pulpy panextern, the peach fleshy, the walnut woody. The amygdalis *persica,* Fig. 107, *a,* is a succulent drupe, of a roundish form, and furrowed on the side; the nut of this drupe is ellipsoid, one-celled, and one-seeded; *b* represents the peach deprived of one half of its pulpy exterior, or panextern, and exposing the nut or panintern; *c* represents the nut divested of one of its valves, and showing the seed *d.*

Fig. 107.

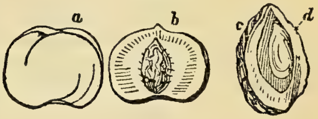


Fig. 108.

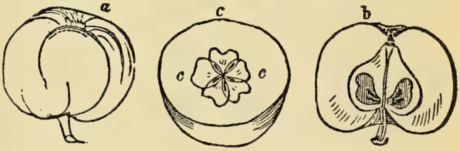
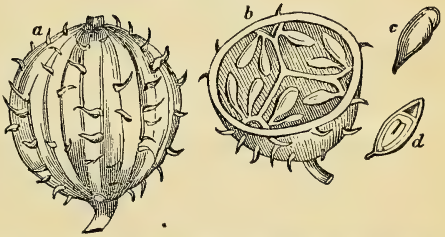


Fig. 109.



96. Order 7th. Baccati (from *bacca,* a berry), simple, succulent fruits, containing many separate seeds. The genera in this order are the following: 1st. *Pyridion* (from *perideo,* signifying lying around), a regular, pome-like fruit, crowned with the adhering calyx. The pericarp has several cells, each of which contains one or more seeds; the embryo has two cotyledons, which are large and fleshy. This genus contains the apple and pear. The apple (Fig. 108) has a round fleshy pericarp, crowned with the calyx; the seeds are inclosed in five carpels, or cells, ranged around in the axis of the fruit; the cells are composed of membranaceous valves. The seeds are tunicated, or coated; *a* represents an entire pyridion; *b,* the same cut vertically, and *c,* the same transversely. At *c* is seen a line, showing *the junction of the calyx with the fruit proper.*[†] 2d. *Pepo* (from *pepo,* a melon), a regular monocephalous fruit, with a radiating *placenta,* containing many seeds; the *panextern* solid and dry; the panintern pulpy; it is globular in the watermelon, oblong in the cucumber. Fig. 109 represents the cucumis *anguria,* prickly cucumber; *a* is the entire

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[*] The panextern includes what is sometimes called epicarp and sarcocarp; the panintern is the same as the endocarp.

[†] "A singular fact is observable in the fruit of the apple: when cut in slices transversely, it exhibits in its substance an exact representation of the five sepals which existed in the flower; I have never, in any *botanical work,* met with a notice of this phenomenon."

Dec. 19, 1850. The preceding note is copied from former editions of this work, to show the *progressive nature* of science; at the present time this fact is fully explained.

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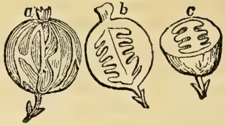
94. Order Cenobionnaires, with its genus—Cenobion.—95. Order Drupaces, with its genus.—96. Order Baccati, with its genera.

pepo, which is *spinose*, three-celled, and many-seeded. The cells and seeds are shown by the same fruit cut transversely, as at *b; c* represents a seed: this is tunicated and dicotyledonous; *d*, the same cut vertically.

3d. *Bacca*, Fig. 110, *a*, represents a spherical berry of the genus Ribes; it is known by the name of wild gooseberry; the fruit is many-seeded, as may be seen at *b; c* shows the same fruit cut transversely

Fig. 110.



CLASS II. ANGIOCARPES.

Fruits covered by a bract, or foliaceous envelope.

97. This class contains the *Strobilum*, or *cone*, a collection of carcerular fruits concealed by scales, formed of bracts or peduncles, whose union produces a globular or conical body, as the juniper, pine, &c. Fig. 111 represents the fruit of the pine, which is composed of woody, close, and indehiscent cupules. The glands are membraneous, one-celled, and one-seeded: *a* is an entire *strobilum; b* is the same, cut vertically; *c*, the large placenta, extending lengthwise through the fruit. The pineapple, *Bromelia*, is a strobilum.

Fig. 111.

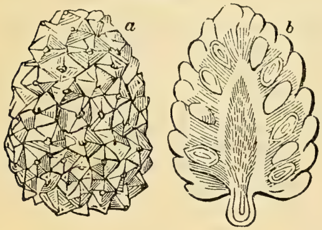


Fig. 112.

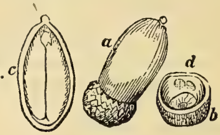
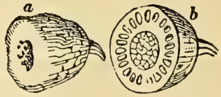


Fig. 113.



1st. *Calybion** (from *kalubion*, a little cabin); fruits of this genus are composed of a *cupule*, or cup, of variable forms, and of *carcerulars* enveloped entirely, or in part, by the cupule. The carcerulars of calybions are called *glands*. The gland of the oak is partly concealed in its cupule; that of the beech and yew (*Taxus*) is entirely concealed; in the latter are *two cupules*, one inclosing the other; the exterior one is succulent, and of an orange-red; the interior, which is hard and woody, incloses the fruit.

2d. *Strobilum*, Fig. 112, represents an acorn, the fruit of the oak (QUERCUS *robur*), standing in a hemispherical *cupule* formed of imbricated scales. The gland is *ellipsoid, coriaceous*, one-celled, and one-seeded. The seed is tunicated; embryo dicotyledonous; the cotyledons are large and fleshy; *a* is an *entire calybion; b*, the *cupule; d, two abortive glands; c*, the *gland cut vertically, showing the embryo near its apex*. 3d. *Sycone* (from *sucon*, a fig), formed by the enlargement of the *clinanthe* or receptacle, into a hollow fleshy substance, covered within by numerous florets, each of which contains a *drupeole;* these florets in the mature state of the fruit disappear, leaving only seeds imbedded in the cellular substance of the pericarp. The cavity within becomes gradually filled by the increase of cellular tissue, until, as in the fig, it entirely disappears. Fig. 113, *a*, represents a sycone, the fruit of the *Ambora*, which belongs to the fig tribe of plants; this remains open at its summit, and is more woody in its texture than the common fig (*Ficus carica*); *b* represents the fruit cut transversely, with the seeds circularly arranged within the sarcocarp. 4th. *Sorose* (from *soros*, a collection); this genus contains many fruits united in a spike, or catkin, and covered with succulent floral envelopes. Fig. 114, *a*, represents the

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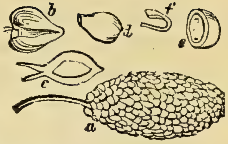
* This includes what some writers call the *gland* and the ***nut***.

97. Class Angiocarpes—Strobilum—Calybion—Sycone—Sorose

Fig 114.



fruit of the MORUS *rubra* (red mulberry); it is oblong; each little drupe surrounded by a succulent pericarp; the nut is one-seeded; *b* represents a detached perianth, containing a *drupeole; c,* drupeole; *d,* a nut; *e,* the same cut transversely; *f,* the embryo.

"I know nothing," says Mirbel, "more deserving our attention than the study of these natural productions (fruits), so simple and yet so varied. When we have once seized the first links of a beautiful chain of facts, we may go on from one discovery to another, astonished that we have so long been ignorant of the admirable industry of nature."*

LECTURE XV.

THE SEED.—SYNOPSIS OF THE EXTERNAL ORGANS OF PLANTS.

98. THE seed may be considered as that link in the chain of vegetable existence which connects the old and new plant; were this destroyed, were nature to fail in her operation of perfecting the seed, what a change would the earth soon exhibit! One year would sweep away the whole tribe of annual plants; beautiful flowers, medicinal herbs, and our most important grains for the sustenance of man and beast, would vanish forever. Another year would take from us many of our most useful garden vegetables, and greatly reduce the number of our ornamental plants. Year after year the perennials would vanish, until the earth would present but one vast scene of vegetable ruin. The ancient pines and venerable oaks, instead of the smiling aspect of ever-renovating nature which they now witness, would, for a time, stand alone in solitary grandeur, the mournful remains of a once beautiful and fertile world! And why are we never filled with alarm, lest the provisions of nature should fail? It is because we know that a Being, unchangeable in purpose, and omnipotent in means, directs the course of physical events, and He has promised, that while the earth remaineth, "seed-time and harvest shall not cease."

We have seen, in the progress of our inquiries, that while the present plant is diffusing around it beauty and fragrance, and ministering to the necessities and luxuries of man, the watchful care of that Being who never "slumbers nor sleeps," is, by a slow but certain progress, perfecting that part which is destined to continue the species, and which "is the sole end and aim of all the organs of fructification."†

99. *The seed is the ovule, or vegetable egg, in a mature state;* it differs from a full-grown ovule by containing within its integument an embryo, or organized body, the complete rudiment of a new plant, similar to that from which it received its existence. The *ovary*, or the case which contains the ovules, is formed from the folded lamina of the leaf, the contracted apex of which forms the style, and an expansion of the same the stigma of the pistil. The *placenta* is the part of the ovary to which the ovule is attached; the connecting stalk is the *funicle;* the point of attachment to the nucleus of the ovule is the *chalaza;* through the latter organs nourishment is conveyed from the placenta to the ovule.

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* *Elémens de Physiologie Végétale,* page 334, vol. I.

† Linnæus.

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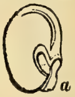
98 Remarks respecting the seed.—99. Seed, how differing from the ovule?—Ovary, how formed? —Placenta—Funicle—Chalaza.

a. The seed consists of the *nucleus*, or kernel, and its *integument*, or covering. The *eye of the seed*, or *hilum*, is the scar formed by the separation of the *funicle.* This connecting membrane is usually very short; but in the *magnolia*, and some other plants, it is several inches in length. When the seed is fully ripe, its connection with the pericarp ceases by the withering and separation of the funicle, leaving upon the outer surface of the seed *the mark of its insertion.*

Fig. 115.



This scar, or eye, is very conspicuous in the bean, which also exhibits the pore (*foramen*) through which the nourishment was conveyed to the internal parts of the seed. That part of the seed which contains the eye is called the *base;* the part opposite is called the *apex.* Fig. 115 represents the garden bean; it is an oblong, tunicated seed, with two thick cotyledons; at *a* may be seen the *hilum*, or eye.

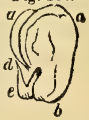
The integument is called the *spermoderm* (from *sperma*, seed, and *derma*, skin); it consists of three coats, the external *skin*, called the *testa* or *cuticle*, the cellular tissue, called *mesosperm*, and the internal skin, or *endosperm.* The outer coat of the seed is important, as the kernel, originally a fluid, could not be formed without its presence.

The *Kernel*, or nucleus, includes all that is contained within the *spermoderm;* the kernel consists of the *albumen*, *cotyledon*, and *embryo.* The *Albumen* is the substance which, in many seeds, is intermediate between the outer integument and the embryo. It is thought to afford support to the germinating embryo plant, as does the white of an egg to the embryo bird.

Both in respect to hardness and color, the albumen in many seeds greatly resembles the white of a boiled egg. It is *farinaceous*, or *mealy*, consisting of cells filled with *starch*, as in buckwheat, and horn-like in coffee. The seeds of the pea and of the cruciform plants are destitute of albumen. In some cases the embryo is inclosed within a *sac*, called *vitellus*, corresponding to the yolk of an egg; it is one of the proper coats of the nucleus which has not been absorbed or converted into albumen during the development of the seed. It is not considered an essential part of the seed, because it is sometimes wanting; but when present, it supports and defends the embryo while imprisoned in the seed, and serves for nutriment when it begins to germinate. Albumen makes up the chief part of some seeds, as the grasses, corn, &c.; in the nutmeg, which has very small cotyledons, it is remarkable for its variegated appearance and aromatic quality. It chiefly abounds in plants which are furnished with but one cotyledon.

Cotyledons (from *kotule*, a cavity) are the thick lobes of seeds. They are the first visible leaves; often fleshy and spongy, of a succulent and nourishing substance, which serves for the food of the embryo at the moment of its germinating.

Fig. 116.



Nature seems to have provided the cotyledons to nourish the plant in its tender infancy. After seeing their young charge sufficiently vigorous to sustain life without their assistance, the cotyledons in most plants wither and die. Fig. 116 represents the cotyledons of the bean, as divested of the outer covering; *a a* represent the two cotyledons; *b* and *c*, the embryo; *d* shows the petioles or stems of the cotyledons.

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a. Parts of the seed—Eye -Integument—The kernel, its parts—Albumen—Cotyledons

100. The number of cotyledons varies in different plants, which circumstance has given rise to the most important divisions of the vegetable tribes. There are also plants in which this organ is wanting, and these constitute a distinct class, called,

Acotyledonous plants, which have no cotyledons in their seeds: such plants belong to the class Cryptogamia, or *flowerless* plants; they have no embryo nor seeds, but are reproduced from spores (minute grains resembling pollen); ferns and mosses are of this class.

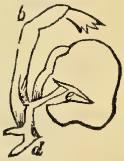
Monocotyledonous plants have but one cotyledon, or lobe, in the seed; as the *grasses*, *liliaceous* plants, palms, &c. They are called ENDOGENS on account of the peculiar growth of their stems.

Dicotyledonous plants have two cotyledons; they include the greatest proportion of forest-trees, *leguminous*, *syngenesious* plants, &c. They are called EXOGENS.

Polycotyledonous plants have more than two cotyledons, as the pine and hemlock: such plants are not common.

101. The *Embryo* first appears as a minute speck in the midst of the pulp of the nucleus, near the *foramen* of the ovule; it gradually develops and assumes an organic state; it lies in the midst of the albumen, or at some of its extremities, or, when there is no albumen, it fills the space within the integuments, as in the Leguminous plants. As the embryo becomes a plant by the unfolding of its parts, it must contain within itself all the essential organs. By laying open the seeds of many plants the embryo becomes visible, as in the bean, orange, and apple. The first part formed in the embryo is the *axis*, its two extremities indicating the radicle and the stem; the *latter* consists of the node, furnished with the rudiments of a pair of leaves; these are the cotyledons. That part of the axis which unites the radicle and the cotyledon is called *caulicle*, or *tigelle*, from the point where the cotyledons are united to the axis, a *bud* is developed; this bud contains the rudiments of the true or *primordial* leaves, and is called the *plumule*, or *plumula*. It may be seen lying between the cotyledons. When the vital principle is excited to action, vessels are formed and parts developed which were before invisible. The *Radicle* unfolds itself into branches or fibers, which take a downward direction, as if to avoid light and air, from their peculiar structure, or from their attraction toward the moisture of the soil. At Fig. 117, appears the embryo in a germinating state; *a* represents the *radicle*, *b* the *plumule*, *c* the *funicle*, by means of which the plant is still connected to the cotyledons;

Fig. 117.



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100. Division of plants as respects cotyledons.—101. First appearance of the embryo—Part first formed—The node—Plume—Radicle.

d the *tigelle*, *axis*, or stem, with its *node* at *b*, crowned with the bud to be developed into the plumule.

To use the words of an ancient botanist, "The embryo continues imprisoned within its seed, and remains in a profound sleep, until, awakened by germination, it meets the light and air, to grow into a plant similar to its parent."

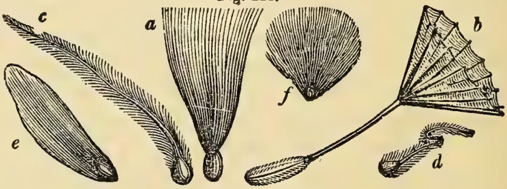
"Lo! on each seed, within its slender rind,
Life's golden threads in endless circles wind;
Maze within maze the lucid webs are rolled,
And as they burst, the living flame unfold.
The pulpy *acorn*, ere it swells, contains
The *oak's* vast branches in its milky veins,
Each raveled bud, fine film, and fiber-line,
Traced with nice pencil on the small design.
The young Narcissus, in *its bulb compressed,*
Cradles a second nestling on its breast;
In whose fine arms a *younger embryo* lies,
Folds its thin leaves, and shuts its floret-eyes;
Grain within grain, successive harvests dwell,
And *boundless forests slumber in a shell*."[*]

102. There are various *appendages* which may, or may not, be present without injury to the structure of the seed. *Aigrette*, or *egret*, sometimes called *pappus*, is a kind of feathery crown with which many of the compound flowers are furnished, evidently for the purpose of disseminating the seed to a considerable distance, by means of winds; as the dandelion, and others of the Compositæ family. The egret includes all that remains on the top of the seed after the corolla is removed, and is supposed to be the attenuated frame-work of the limb of the calyx.

Stipe, is a thread connecting the egret with the seed. The egret is said to be *sessile* when it has no stipe, *simple* when it consists of a bundle of hairs without branches, *plumose* when each hair has other little hairs arranged along its sides like the beards on a feather.

In Fig. 118, *a* represents the *capillary*, or hair-like egret; *b* is a pedicelled egret; *c* and *d* show the style remaining, and forming a *plumose train*, as in the virgin's-bower and Geum; *e* a wing, as may be seen in the fir; *f*, a sessile egret.

Fig. 118.



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[*] These lines, which so beautifully set forth the manner in which the embryo is contained within the seed or bulb, are not strictly philosophical, as to the fact of the future generations lying infolded the one within the other; it is true that we may in many seeds discern the form of the future plant, but we cannot believe that this miniature image contains another embryo, and so on through successive generations; for the fact is established, that a seed does not produce a plant without being fertilized by the pollen. We may say that a seed contains within itself the *elements* of future generations; but not their *images*, except that of the immediate plant which is to issue from the perfected seed.

102. Appendages to the seed—Stipe.

103. *General Remarks upon Seeds.*—The *number of seeds* in plants is variable; some have but one; some, like the umbelliferous plants, have two; some have four. The number varies from these to thousands. A stalk of Indian corn is said to have produced, in one season, two thousand seeds; a sunflower four thousand. A capsule of the poppy has been found to contain eight thousand seeds. It has been calculated that a single thistle-seed will produce, at the first crop, twenty-four thousand, and at the second crop, at this rate, five hundred and seventy-six millions. In the same species of plants the number of seeds is often found to vary; the apple and many other fruits might be given as examples.

Seeds, *according as they vary in size*, have been divided into four kinds: *large*, from the size of a walnut to that of the cocoanut; *middle* size, neither larger than a hazle-nut nor smaller than a millet-seed; *small*, between the size of the seeds of a poppy and a bell-flower; *minute*, like dust or powder, as in the ferns and mosses.

When a pericarp separates itself from the parent plant, or *when the valves open, the fruit has ceased to vegetate;* like the leaves at the end of autumn, it has lost its vital principle, and becomes subject to the laws which govern inorganized matter. The maturity of the seed marks the close of the life of annual plants, and the suspension of vegetation in woody and perennial ones. Nature, in favoring by various means the dispersion of these seeds, presents phenomena worthy of our admiration; and these means are as varied as the species of seeds which are spread over the surface of the earth.

a. The air, winds, rivers, seas, and animals, transport seeds, and *disperse them* in every direction. Those which are provided with *feathery crowns*, or *egrets*, as the dandelion and thistle, or with *wings*, as the maple and ash, are raised into the air, and even carried across the seas. Linnæus asserted that the ERIGERON *canadense* was introduced into Europe from America, by seeds wafted across the Atlantic Ocean. "The seeds," says he, "embark upon the rivers which descend from the highest mountains of Lapland, and arrive at the middle of the plains, and the coasts of the seas. The ocean throws, even upon the coasts of Norway, the nuts of the mahogany and the fruit of the cocoanut-tree, which have been borne on its waves from the far-distant tropical regions; and this wonderful voyage is performed without injury to the vital energy of the seeds." Some fruits, endowed with elasticity, throw their seeds to a considerable distance. In the oat, and in the greater number of ferns, this elasticity is in the calyx. The pericarp of the IMPATIENS* upon being touched, when the seeds are ripe, suddenly folds itself in a spiral form, and, by means of its elastic property, throws out its seeds. Animals perform their part in this economy of nature. Squirrels carry nuts into holes in the earth. The Indians had a tradition, that these animals planted all the timber of the country. Animals contribute also to the distribution of seeds, by conveying them in their wool, fur, or feathers. Although distance, chains of mountains, rivers, and even seas, do not present obstacles sufficient to prevent the dispersion of plants, *climate* forms an eternal barrier which they cannot pass. It is probable, that in future times the greater part of vegetable tribes which grow between the *same parallels of latitude*, may be common to the countries lying between them; this may be the result of the industry of man, aided by the efficient means which nature takes to promote the same object, in the dissemination of seeds; but no human power can ever cause to grow within the polar circles the vegetables of the tropics, or those of the poles at the equator; nature is here stronger than art. That much may be done to promote the growth of tropical plants in our climate is true, but how different are they with us, from the same species in their own genial climate! In New England the gardener may toil and watch for years to nurture an orange or lemon tree, which, after all, is stinted in its growth; while in its own native home, the same plant would have grown spontaneously, in luxuriant beauty.

b. The diffusion of seeds completes the circle of vegetation, and closes the scene of vegetable life. The shrubs and trees are despoiled of their foliage, the withered herbs decompose, and restore to the earth the elements which they had drawn from its bosom. The earth, stripped of its beauty, seems sinking into old age;—but, although the processes of nature may have been unseen and unmarked by man, innumerable germs have been formed, which wait but the favorable warmth to decorate with new brilliancy this terrestrial scene. So fruitful is nature, that a surface a thousand times more extended than that of our globe, would not be sufficient for the vegetables which the seeds of one single year would produce, if all should be developed; but great quantities are eaten by men and animals, or left to perish in unfavorable situations. Some are carried into the clefts of rocks, or buried beneath the ruins of vegetables; here, protected from the cold, they remain inactive during the winter season, and germinate as soon as the early warmth of spring is felt. Then the pious Botanist, beholding the vegetable species with which the earth begins to be clothed, and seeing successively all the types or representations of past generations of plants, admires the power of the Author of nature, and the immutability of his laws.

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* The cultivated IMPATIENS is sometimes called *Ladies'-slipper*, sometimes *Balsamine.*

103. Number of the seeds variable—Size variable—Separation of the pericarp from the plant—What is denoted by the maturity of the seed?—*a.* Dispersion of seeds, how effected?—Elasticity of some fruits—Agency of animals—Effect of climate upon the dispersion of plants—*b.* Circle of vegetation completed.

LECTURE XVII.

THEORY OF THE METAMORPHOSIS OF THE ORGANS OF PLANTS.

104. We will take a general view of the *growth of plants*, with the *transformation* or *metamorphosis of the vegetable organs* during the progress of development, from germination to decay. A *seed* may be considered as an *organized*, *living plant*. We have seen, that by the application of warmth, moisture, and oxygen, its life becomes active; it begins to develop parts that before lay folded up, and concealed from observation. Botanists of the present age have been much occupied in tracing the *germination* of the seed, and the *development* and *transformation*, or *metamorphosis*, of the different organs of the plant; it is found that these are but modified forms of the various *tissues* from which they are elaborated.

105. The development of the organs of plants appears under three forms: *normal*, *abnormal*, and *accidental*. The *normal* process is exhibited in the progressive and regular development of organs, according to established laws. The *abnormal* process is when there is a failure to produce regular results, either from irregular action, or a want of energy in the vital functions of the plant. The *accidental* process is when irregularity is produced by external causes, as the puncture of insects, external injuries, &c.

106. In the *normal* process, there is a regular *progression* commencing with the *seminal* leaves, and going on through the whole existence of the plant, developing various organs by successive stages, to the final production of the flowers and fruit. In *annual* plants the progress is rapid from the germi-

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Concluding remarks.—104. The organs of the plant are modified forms of tissues.—105. Three forms of development of organs.—106. Normal process.

nation of the seed to the full growth of the plant, the formation of the flower, and the perfection of the new seed. We see instances of the *abnormal* process in cultivated plants, where an excess of nourishment causes a plethora, and organs which would otherwise have gone on to become stamens and pistils, remain partially formed; this may be seen in petals which appear to have assumed in part the appearance of stamens or pistils. It is not that usually the perfect stamen or pistil goes back to become a petal, but the natural progression is from the calyx to the petal, from that to the stamen, while the crowning of the work is the formation of the pistil; an essential part of which is the germ, or envelope containing the new seed or future plant. Between the perfect stamens and outer row of petals in double flowers, as peonies, roses, tulips, &c., may be traced the gradual transformation of the petals to stamens; next to perfect petals, appear those which are imperfectly formed, then a petal with a distorted limb on one side, and an imperfect anther or filament on the other. There is, in some cases, a *retrograde* transformation of pistils into petals, as in double roses; and in others of pistils into stamens.

107. The *axis* of a plant is that part around which all the organs or parts center. The root is the *descending axis*, the stem the *ascending axis.* On the germinating of a seed, the ascending axis appears as a bud, or *growing point*, protected by rudimentary scales which gradually expand into leaves below, while new leaves are developing above. The axis is always terminated by a bud, and is thus elongated in one direction, or grows upward. During the growth of the stem its elongation is checked at intervals, by which narrow portions called *nodes* are rendered more firm than the spaces between them, which are called *internodes.* The *nodes* sometimes form entire *rings* round the stem; sometimes they are divided, appearing as scattered points on the circumference. From the nodes, under ordinary circumstances, all buds, and consequently all leaves and branches, originate. The manner in which branches come off from the nodes causes the different forms of trees, as pyramidal, spreading, or weeping; the angles formed by the stem being more or less acute or oblique. In the Lombardy poplar the branches are erect, forming acute angles with the upper part of the stem; in the oak they are spreading, forming nearly a right angle; in the weeping-willow they are pendent, being more flexible. The comparative length of the upper and under branches also gives rise to the difference in the contour of trees, as may be seen in the conical form of some, and the umbrella-like form of others.

Abnorma process—Retrograde.—107. Axis of the plant—Bud—Nodes—Internodes—Branches.

108. Each bud is a distinct individual, capable of an independent existence, as may be seen in the case of ingrafting layers, &c.; but, remaining on the parent stem, buds become *branches*, each of which may produce buds and *branchlets*. A perfect plant may be considered as a *compound individual* formed of as many units as there are buds, and as many buds as there are branches and leaves. In the process of its growth, the plant continues to enlarge, and the leaves attain their highest degree of perfection. The growing point now ceases to lengthen in the direction of the axis, slender branches are thrown out, and there is often, in these branches, a diminution in the size of the leaves, which expand in crowded or concentric verticils, or whorls. A new development now appears, and instead of a leafy branch we see a *flower*. This transformation usually takes place gradually, each successive cauline leaf gradually contracts its circumference, loses its numerous lobes and incisions, and expands more or less near the stem; thus are formed those transition leaves called *bracts*. These sometimes resemble cauline leaves, but in some cases assume the hue and texture of flowers. Sometimes the flowering process is rapid; the stem sends forth a slender elongated shoot from the node which corresponds to the last leaf, and forms a *whorl*, by crowding several partial nodes into a ring at the extremities of the shoot; thus a verticil, or collection of leaves, appears as sepals or parts of the calyx.

109. A *flower* is a *transformed branch*, *all its organs being leaves which have undergone a peculiar metamorphosis*. The development of flowers near the bracts is the cause of the leaves from which they are transformed becoming checked and diminished in their growth; and if such be the nature of bracts, it follows that all their modifications, such as the spatha, involucre, and the cup of the acorn, are imperfect leaves. In the Camellia japonica the bracts and sepals are so similar that they are scarcely distinguishable. The Strawberry has five little bracts alternating with the five sepals, and closely resembling them. In the Mallow tribe there is a *whorl of bracts* at the base of the calyx closely resembling sepals; these are usually said to have a double calyx. From sepals to petals the transition is easy. The calyx, though usually green, and leaf-like, is often colored, and delicate in texture. The Fuchsia, or Eardrop, has a colored calyx which would be considered a corolla but for the inner covering which infolds its stamens. In the lily and tulip the floral envelope is often green on the outside and richly colored within, and without terming it either calyx or corolla, we call it a *perianth*. Such

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108. Process of development.—109. Flower a transformed branch—Transformation of floral organs

being the relation between the calyx and corolla, if sepals, or the parts of the calyx, are transformed leaves, so must be the petals.

110. The stamens which occupy one or more whorls next within the corolla exhibit no resemblance to leaves, yet we have seen that they do not differ from them in nature. We will add, that in the Nymphæa *odorata*, or white water-lily, the transition of sepals into petals, and of petals into stamens, may be distinctly traced. The four or five sepals are green on the outside, but somewhat petal-like within; the outermost of the whorls of petals are tinged with green. Between the perfect petals and the stamens there is a row of organs which are neither one nor the other, but diminutive petals, with anthers upon their summits. The more perfect formation of stamens next appears. In some cases we see the retrograde process of stamens being changed to green leaves. The *simple pistil* is formed of a *folded leaf*, and a compound pistil of a whorl of leaves, pressed and cohering together. In the Iris we see three dilated stigmas which are identical in form and appearance with so many petals.

111. By *expansion* and *contraction* the great objects of nature seem to be effected in the vegetable growth. From the *seed* to the fullest development of the cauline leaves there is *expansion;* to form the *bracts* and *calyx* there is *contraction.* The *corolla* is produced by a new *expansion;* the *stamens* and *pistils* by another *contraction.* These *expansions* are often very great in the fruit; and lastly, the greatest degree of *concentration* or *contraction* is in the seed. Fruits are transformed leaves;—the *follicle* is a simple leaf folded upon itself, with its two margins soldered together; the *silique* is formed of *two leaves* folded and combined together; the more *compound* seed-vessels are produced from a verticil of *several folded leaves*, collected round a common center, and soldered together by their contiguous margins. Each of the folded leaves is called a *carpel.* The analogy of the carpels with the organs which precede them, is shown by the fact that the stigma often remains upon the ovary. The inflated portion of the carpel forms a case for the young seeds. It has been supposed that seeds are produced on the veinlets of the leaf projecting beyond the margin. The ovules, or rudiments of seeds, have been found, by a retrograde or abnormal process, to exhibit their tender cotyledons in the form of leafy expansions. "Each simple *pistil* is formed of a folded. metamorphosed leaf, and is termed a *carpel*, or little fruit. The *ovules* are usually produced on the *margins* of the metamorphosed leaf, and are arranged along

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110. Relation between sepals and petals—The pistil a folded leaf.—111 Expansion and contraction—Examples—Fruits—Carpel—Origin of seeds.

the *seam* formed by the union of those margins. Where there are several pistils or carpels in one flower, and these soldered together, we have, of course, a *compound fruit*, with several cells, and even entire carpels may be, and often are, wholly suppressed or obliterated; yet our theory enables us to comprehend all such deviations from the normal structure or original symmetry of the carpellary verticil."*

SYNOPSIS OF THE EXTERNAL ORGANS OF PLANTS.

112. *Organs.* *Subdivisions.*

- **Organs of nutrition, or parts necessary to the growth of the plant.**
  - THE ROOT.
    - NECK OR ROOT-STALK,
    - CAUDEX,
    - RADICLES.
      - *spongioles.*
  - THE STEM.
    - BRANCHES,
      - *branchlets*
      - *boughs.*
    - PETIOLES,
    - PEDUNCLES
      - *pedicels.*
  - THE BUD.
    - SCALES.
  - THE LEAF.
    - LEAFLETS.
  - APPENDAGES.
    - STIPULES,
    - PRICKLES,
    - THORNS,
    - GLANDS,
    - STINGS,
    - SCALES,
    - TENDRILS,
    - PUBESCENCE,
    - BRACTS.
- **Organs of reproduction, or parts of fructification.**
  - THE FLOWER.
    - CALYX,
      - *sepals or leaves.*
    - COROLLA,
      - *petals.*
    - NECTARY OR DISK
      - *part of the corolla, which sometimes appear as a separate organ.*
    - STAMEN,
      - *filament,*
      - *anther,*—
        - pollen.
    - PISTIL,
      - *stigma,*
      - *style,*
      - *ovary,*—
        - ovules.
  - THE FRUIT.
    - PERICARP,
      - Contains all parts of the frui which are not the *seed*, as
      - *cells,*
      - *valves,*
      - *dissepiments.*
    - SEED,
      - *columella,*
      - *hilum,*
      - *albumen,*
      - *cotyledons,*
      - *embryo,*
        - axis,
        - node,
          - plumule,
          - radicle.

LECTURE XVIII.

PHYSIOLOGICAL VIEWS.—GERMINATION OF THE SEED.

113. We have traced the various organs of the plant through their successive stages of development, from the root to the bud, leaf, and flower, and from the flower to the fruit and seed. We have seen, in imagination, the vegetable world fading under a change of temperature, the "sear and yellow leaf" becoming a prey

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* Darlington.

Of compound fruits.—112. Enumerate the organs of nutrition—Of reproduction—Parts of the root—Stem—Bud—Leaf—Different kinds of appendages—Divisions of the calyx—Corolla—Nectary—Stamens—Pistil—Parts of the fruit—What are the parts of the pericarp?—Parts of the seed—Of the embryo.—113. Reflections.

to the autumnal blasts, and even the fruits themselves, becoming a mass of decayed matter. Were this appearance of decay and death now presented to us for the first time, how gloomy would be the prospect! How little should we expect the return of life, and beauty, and fragrance! No power short of Omnipotence could effect this; it is indeed a miracle! But we are so accustomed to these changes, that, "seeing, we perceive not;" we think not of the mighty Being who produces them; we call them the *operations of nature;* but what is nature, or the *laws* of *nature*, other than manifestations of Almighty power? The word *nature*, in its original sense, signifies *born*, or *produced;*—let us, then, look on nature as a creation, and beware of yielding that homage to the creature which is due to the Creator. The skeptic may talk with seeming rapture of the beauties of nature, but cold and insensible must be that heart, which, from the contemplation of the earth around, and the heavens above, soars not to Him,

> "The mighty Power from whom these wonders are."

How impressively is the reanimation of the vegetable world urged by St. Paul, as an argument to prove the *resurrection from the dead!* The same power, which from a dry, and apparently dead seed, can bring forth a fresh and beautiful plant, can assuredly, from the ruins of our mortal frame, produce a new and glorious body, and unite it to the immortal spirit by ties never to be separated! Leaving the external organs of the plant, we are now to enter the inner temple of nature, and to examine into those wonderful operations by which vegetable life is called into action and sustained.

114. Germination.—The process of the shooting forth of the new plant is called *germination*. The principle of life contained in the seed does not usually become active until the seed is placed in circumstances favorable to vegetation. When committed to the bosom of the earth, its various parts soon begin to dilate by absorbing moisture. Chemical action then commences, *oxygen* from the air unites to the *carbon* of the seed and carries it off in the form of *carbonic acid* gas. As the carbon of the cotyledons by this process continues to diminish, and oxygen is produced in excess, a sweet, sugar-like substance is formed; this being conveyed to the embryo, it is by its new nourishment kindled into active life; from this period we may date the existence of the *young plant*. The embryo bursts through its integuments, which dissolve by their loss of carbon; the *radicle* shoots downward, and the *plume* rises upward. We then say the seed has *come up*.

Fig. 119.

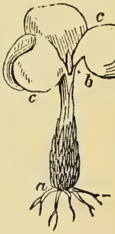

Fig. 119 represents a young dicotyledonous plant, with its radicle, *a*, developed; its plume, *b*, issuing as a bud from the first node of the axis, is yet scarcely perceptible; its cotyledons, *c c*, appear in the form of large, succulent seed-leaves. The radicle seeks in the soil nourishment for the future plant, and to fix it firmly in the earth. It always takes a downward course, in whatever situation the seed may have been placed in the ground. A Botanist once planted in a pot six acorns, with the radicular points of their embryos upward. At the end of two months, upon removing the earth, he found that all the radicles had made an *angle*, in order to reach downward.

Fig. 120.

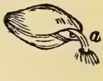

Fig. 120 is a representation of a germinating seed of the *Mirabilis* (four-o'clock); it will be seen that the radicle, *a*, has made nearly a right angle in turning downward; the plume is not developed. Place

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114 Germination—Effect of oxygen—Of the loss of carbon—Direction of the radicle—Describe the experiment with acorns—Describe Fig. 120.

some cotton into a tumbler of water, and put upon it some seeds of rye or wheat, all the fibres shooting from the seeds will seek a direction downward.

Fig. 121.

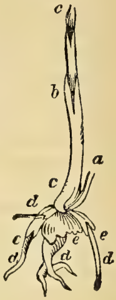

Fig. 121 represents a young plant of rye, which is monocotyledonous; at *a* is the cotyledon; at *b*, the second leaf, which appears about the sixth day; at *c* is the primordial leaf,* which at first envelops and conceals the other leaves; at *d* are the several branches of the root, bearing their radicles, and at their base enveloped by a peculiar covering, *e*,† through which the extremities have forced their way.

a. Earth, though not absolutely essential to germination, is useful, as affording to the vegetable egg a favorable situation, where it may receive the influence of the various agents which are to perform their offices in the development of its parts. But plants may vegetate without earth. The parasite grows upon the bark of other plants, or feeds on air alone; and many seeds vegetate in water. *Air* is essential to vegetation;—under an exhausted receiver a seed will not germinate, although possessing every other requisite. Seeds that become imbedded deeply in the ground do not vegetate unless accidentally plowed up or otherwise exposed to the contact of the atmosphere. Acorns supposed to have been long buried have germinated as soon as raised sufficiently near the surface of the earth to receive the influence of air.

We have seen, in the process of germination, that *oxygen gas* unites with the carbon of the seed, and carries it off in the form of carbonic acid. Air furnishes that important agent, oxygen, which is the first moving principle of vitality. *Carbon* constitutes the greater part of the substance of seeds; and this principle, being in its nature opposed to putrefaction, prevents seeds from rotting previous to their being sown. Some seeds, having an abundance of carbon, are capable of being preserved for many years; while others, in which this element exists but in a small proportion, require to be sown almost as soon as ripe; and such as are still more deficient in carbon lose their vital principle before separating from the pericarp. Oxygen is therefore important to germination on account of its agency in removing the carbon which holds the living principle of the seed in bondage. The *absence of light* is favorable to the germination of seeds, for light acts upon plants in such a manner as to take away oxygen by the decomposition of carbonic acid gas, and to deposit carbon; now this is just the reverse of the process required in germination, where the carbon must be evolved and the oxygen in excess. A certain degree of *heat* is necessary to germination. Seeds planted in winter will remain in a torpid state; but as soon as the warmth of spring is felt the embryo emerges into life. By increasing heat the vegetating process may be hastened; thus the same seed, which with a moderate degree of heat would germinate in nine hours, may be brought to this state in six hours by an increase of temperature. Too great heat destroys the vital principle; thus corn which has been roasted cannot be made to vegetate. The process of *malting* consists in submitting some kind of grain (barley is most commonly used) to a process which causes an incipient state of germination; this is done by moistening the grain, and exposing it to a suitable degree of warmth; as soon as germination commences the process is stopped by increasing the heat. The taste of the grain is then found to have become sweetish. The term *malt* is given to grain which has been submitted to this process. When mixed with water it forms a sweetish liquor, and the fermentation of this liquor produces beer.

b. There is a great difference in plants as to their *term of germinating;* some seeds begin to vegetate before they are separated from the pericarp.‡ In the

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* Called by Mirbel the *pileole.*

† The *coleorhize.*

‡ In the month of January, on observing the seeds of a juicy apple which had been kept in a warm cellar, I saw that they were swollen, and the outward coat had burst; examining one seed, by removing the integument and separating the cotyledons, I saw, by the help of a microscope, the embryo

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Explanation of Fig. 121—*a.* Earth important to vegetation—Air—Oxygen—Carbon—The absence of light favorable to the germination of plants—Heat—*b.* Season of germinating.

greater number of vegetables, however, there is no germination until after the opening of the pericarp and the fall of the seed. The time at which different species of seeds, after being committed to the earth, begin to vegetate, varies from one day to some years. The seeds of grasses and the grain-like plants, as rye, wheat, corn, &c., germinate within two days. The cruciform and the leguminous plants, as the pea and bean, require a little more time. The peach, walnut, and peony, remain in the earth a year before they vegetate. All kinds of plants germinate sooner if sown immediately after being separated from their pericarps. Many vegetables preserve their vital principle for years; some lose it as soon as they are detached from their pericarps; this is said to be the case with respect to coffee and tea. It is asserted that mosses, kept for near two hundred years in the herbariums of botanists, have revived by being soaked in water. An American writer* says, that "seeds, if imbedded in stone or dry earth, and removed from the influence of air or moisture, might be made to retain their vegetative quality or principle of life for a thousand years;"—and he adds, "life is a property which we do not understand; yet life, however feeble and obscure, is always life, and between it and death there is a distance as great as existence and non-existence."

c. The subject of vegetable physiology, though highly interesting, is in many of its details too complicated for the youthful investigator; but enough has now been presented to show how large a field this science covers. The physician finds in the vegetable organization striking analogies to the internal structure of the animal frame; to him the language of physiological botany is familiar, because it is borrowed from his own science. On the other hand, the botanical student, in learning the names and offices of the various internal organs of plants, is making no inconsiderable improvement in the knowledge of the animal economy; and deficient in the power of analogical reasoning must be that mind which is not, by the consideration of the one, led to reflect upon the organization of the other.

LECTURE XIX.

PHYSIOLOGICAL VIEWS.—ELEMENTARY ORGANS OR VEGETABLE TISSUES.—SOLID AND FLUID PARTS OF VEGETABLES.

115. THE careless observer of nature may consider the trunk of a tree, a leaf, or a stem of an herb, as very simple in its structure, presenting little more than a homogeneous mass; but the botanist has learned that plants, like animals, are formed of tissues of different kinds, variously fitted to carry on the operations of imbibing nourishment, of making a chemical analysis of the same, of appropriating to themselves such elements as are necessary to promote their health and vigor, and of rejecting such as are useless;—in short, that they have parts which are analogous to skin, bones, flesh, and blood: that they are living, organized beings, composed of solid and fluid parts; and, like animals, are the subjects of life and death Plants differ from animals in being destitute of the organs of sense. They can neither see, hear, taste, smell, nor touch. Some vegetables, however, seem to have a kind of sensibility like that derived from the organs of touch; they tremble and shrink back upon coming in contact with other substances; some turn themselves round to the sun as if enjoying its rays. There is a mystery in these phenomena. It is not yet fully known at what point in the scale of existence animal life ends and vegetable life commences. Some beings, like the sponge and corals, seem

in a germinating state; the radicle was like a little beak; the tuft of leaves and the stem were plainly to be seen in the node of the axis.

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* B. Barton.

Vital principle of seeds—*c.* Language of vegetable physiology borrowed from animal physiology —115. Different aspects of vegetables to the careless observer and the philosopher—Difficult to determine where vegetable life commences.

almost destitute of any kind of sensation, and yet they are ranked among animal substances.

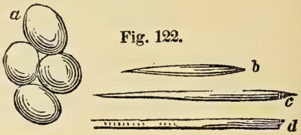

Fig. 122.

116. The vegetable substance consists of parts, called by the general name *tissue*, divided into Cellular and Vascular. The chemical basis of this tissue is carbon, oxygen, and hydrogen, and, in a few cases, a small proportion of nitrogen; the organic basis is *membrane* and *fiber*. The membrane forms ovoid cells (Fig. 122, *a*), while the fiber is elongated into tubes (*b c d*). It seems that, primarily, all vegetable tissue is cellular or membraneous, and that by the fixation of carbon in the membraneous substance, is formed the harder, vascular tissue, which gradually becomes fibrous; (thus, *c d*, Fig. 122, show the cells, seen at *a* becoming *vascular*).

117. Cellular tissue, Parenchyma, consists of cellules (minute cells or vescicles) adhering together; at first they are of a roundish form, but by the action of their mutual pressure they become elongated and flattened at the sides, and sometimes assume an hexagonal appearance, like the cells of honeycomb; in some cases this tissue resembles the froth of fermenting liquor.

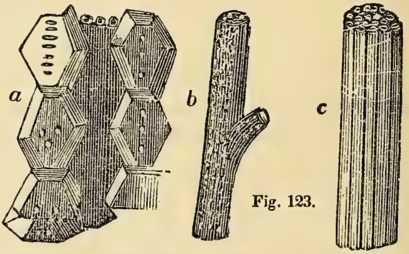

Fig. 123.

Fig. 123, *a*, represents the hexagonal cellular tissue of the pith of Sambucus (the elder plant). The size of cells varies from one-twentieth to one-thousandth of an inch in diameter. The cellules are largest in the most rapid growing parts of the plant, as in the Gourd; they are destitute of visible pores, but fluids are transmitted by them.

a. From coloring matter, *chlorophyl*, contained within the cells the leaf exhibits its rich green, and the corolla its various hues; but cellular tissue is in itself transparent.

b. The organical cells of plants appear to be the seats of the various changes which constitute the functions of nutrition and reproduction. In cellular plants no other tissue is ever formed. They absorb nourishment through their membranes, and produce new individuals by the secretions they elaborate. In the newly formed tissue of vascular plants there is only cellular tissue.

c. Crystals are found within the cellules of some plants; they are of different sizes and forms; some have the appearance of bundles of fine needles, and from this cause the term *raphides* (from the Greek *raphis*, a needle) has been given to the whole class, though now they are found to be variously formed. Raphides are found in liliaceous plants, in the squill, in the sepals of the strawberry, and in the Turkey rhubarb, in which they exist as the *oxalate of lime*.

The Cellular tissue composes the pith, parenchyma, and cotyledons of almost all vegetables. It is abundant in tubers,

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116. Vegetable tissue.—**117.** Cellular tissue—*a.* Chlorophyl—*b.* Functions of cells--*c.* Raphides Cellular tissue, where found?

pulpy and fleshy fruits, and the stems of grasses; constitutes the principle part of mushrooms and other cryptogamous plants. In the bark of plants it is situated under the cuticle, giving its color to the bark, as the same texture under the human cuticle does to the skin. In the pith of young plants the cells are filled with watery fluids, but in older plants they are empty, or only filled with air.

118. *Vascular* or vegetable *fiber* consists of membraneous tubes tapering to a point at each end; they unite by frequent *anastomoses*, and thus form a kind of net-work; they are protected by a coating of cellular integument; their sides are thick and almost opake. They extend throughout the whole plant, distributing air and other fluids necessary to vegetation. The vascular system of plants presents a variety in respect to form, and the functions which the different parts perform. *Entire vessels* exist without any perforation; these convey the proper juices of the plant, and generally contain oils and resinous juices. *Porous vessels* exhibit many perforations; they often separate and again unite, changing at length into cellular integument. *Spiral*, or *screw form* vessels (Fig. 124, *a*), are also called *tracheæ*, from a supposed analogy to the tracheæ or breathing organs of insects; they appear to the naked eye like silvery threads, fine as a spider's web. By pulling asunder carefully the young stems or leaves of some plants, we may see these shining fibers still extending from one severed portion to the other. They are so elastic that they may be somewhat drawn out, and will coil themselves into a bundle when the external force ceases to act. The fiber turns spirally from right to left. Ducts (or *false tracheæ*) are vessels in which the internal fiber does not form a complete spiral coil; they may be *annular* (Fig. 124, *b*), the sides being marked with transverse coils or rings. *Moniliform ducts* (from *monile*, a necklace) have a beaded appearance formed by porous cells contracted at their point of union (Fig. 124, *c*); these serve to connect larger vessels, and to convey sap from one set to another. *Lactiferous* (or milk) *vessels* are met with in the inner bark and

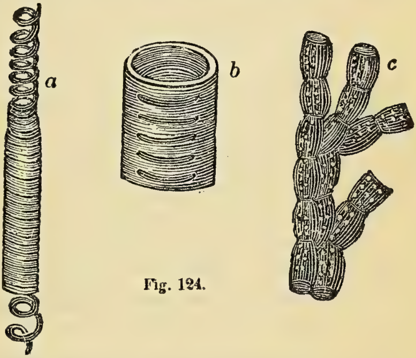

Fig. 124.

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118 Vascular fiber—Entire vessels—Porous—Spiral—Ducts—Moniliform—Lactiferous.

under side of leaves; they contain a fluid, at first transparent, but which becomes white, yellow, or of a reddish hue. These vessels are long, branched tubes, which anastomose freely, and thus resemble the vessels of the animal system.

a. The solid substance of plants is all composed of some varieties of cellular and vascular tissue. Roots and stems are made up of vascular fibers; these may easily be split longitudinally, as the vessels in this case are only separated, and the cellular texture easily yields; but in severing the roots and stems horizontally, greater resistance is to be overcome, since the tubes are to be cut across.

b. Vegetables, like animals, have a *system of glands*, or internal vessels, which are made subservient to the purpose of producing changes in the fluids of the plants;—thus the sap is converted into the proper juices; and from the same soil and nourishment plants of very different properties are produced. Mirbel, by the aid of the microscope, succeeded in discovering a *system of glands* in pores or cells, and on the borders of the spiral vessels. There are also external glands, as the nectariferous glands in the corollas of flowers and the stings of plants.

FLUID PARTS OF VEGETABLES.

119. The different elementary fluids in the vegetable body may be considered under three general divisions: the *sap*, or *ascending fluid;* the *cambium*, or *descending juice;* the *proper juices.*

The *sap* is a limpid, inodorous liquid, the elements of which are imbibed from the earth by pores in the radicles of the root. Water, holding in solution various substances, such as earths, salts, animal and vegetable matter, is absorbed by the radicles, which by some unknown process convert this fluid matter into sap; and then, by means of vessels which form what is called the *sap-wood*, or *alburnum*, this sap *ascends* through the stems to the branches; passing through the woody part of the petioles, and those minute branches of the petiole which form the ribs and veins of the leaf, it enters into the vessels and cells which extend throughout its substance. In the leaves the sap undergoes changes in composition, after which it is returned to the bark.

a. The *ascending sap* is always in circulation, but its energy varies with the season and the age of the plant. Heat has an important influence in quickening the ascent of the sap; yet, during a dry and hot season, it often appears to ascend but slowly. This is because the absorption of fluids from the earth is checked by the dryness of the soil. The plant, by a little stretch of the imagination, may be considered as thirsty, and thus man may seem not only provident, but humane, in administering to its roots refreshing draughts of water. Even the leaves, at such a period, seem too impatient to wait for supplies by means of the connecting sap-vessels; for if water be sprinkled upon them, they fail not to use their own power of absorption, and upon such an application, may be seen to revive almost instantaneously. When the moisture of the earth coincides with elevation of temperature, the sap ascends with the greatest rapidity; this is the case in spring. It is at this period that incisions are made into the wood of maple-trees, in order to procure sap for the manufacture of sugar. The sap may at this time be seen flowing almost in

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a. All the solid substance of plants composed of tissue—*b.* Glands.—119. Three kinds of fluids What is the sap, and how formed?—What is the use of the sap-wood?—*a.* Effect of drought up the plant—Why are incisions made in maple-trees in the spring, rather than at any other period?

a stream. It has been thought that the circulation of sap was wholly suspended during winter; this, however, seems not to be the case; for we may observe during this season a gradual development of some parts of the plant; we see many plants preserving the freshness and verdure of their foliage, and mosses putting forth their flowers. We must, then, believe that the sap is in perpetual motion, susceptible of being accelerated or retarded by changes of temperature, and humidity or dryness of the earth. The development of buds must be attributed to the ascension and redundancy of the sap, which dilates and nourishes their parts. In spring, when the ascent of the sap is accelerated, the buds enlarge rapidly, and their complete development is soon perfected.

120. The theory of the movements which take place between fluids of different densities, called *Endosmosis* and *Exosmosis*, or *imbibition* and *permeability*, explains many of the phenomena in vegetable physiology. It is found that if two fluids of different density be separated by a membrane without visible pores, the lighter fluid is imbibed by the membrane; the denser fluid also passes outward; thus the two fluids undergo the same process of *transudation:* the name of *Endosmose*, to pass within, and *Exosmose*, to pass without, has been given to these changes. This process may account for the fact, that about the roots of plants their peculiar qualities may be detected in the soil; and the same is observed of water in which a plant has been made to vegetate. The cell containing a fluid thicker than water, *imbibes* water by *endosmosis*, and *yields* by *exosmosis* a portion of its liquid contents to a contiguous cell containing a still denser fluid. When the leaf-buds become stimulated by an increase of sap, the *Endosmotic* process commences in their cells, and gradually extends to the roots, which are absorbing new supplies of fluid from the soil. The juices which had been accumulated during winter pass through changes, certain substances are dissolved, and the sap becomes thickened; thus the *endosmotic* process is greatly increased, and an active circulation goes on through the whole system of the plant. Toward the latter part of the season light and heat are less powerful, the leaves perform their office more languidly, and there is more equilibrium in the density of fluids, until circulation ceases.

121. The vascular texture appears by its tubes and channels to afford great facilities for the ascension of the sap. In imperfect plants, such as mushrooms and lichens, which are wholly composed of cellular texture, it is not known that there is any ascent of sap, but they seem to be nourished by fluids absorbed from the air The question naturally arises, By what force is the sap made to ascend, contrary to the laws of gravitation? Some have asserted, that this phenomenon was owing to the *contraction* and *dilatation* of the air, and of the juices of the plant; others have referred it to the action of *heat;* these two propositions, however, amount to the same thing, since *heat* is the cause of the contraction and dilatation referred to. Some ascribe the ascent of the sap to the *irritability* of the vessels, and the *energy* of *vital power.* The latter is but a vague and unsatisfactory explanation, since we

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Perpetual motion of sap—Cause of development of buds.—120. Endosmosis and Exosmosis.—121. Vascular texture unlike the cellular in affording facilities for the ascension of sap—Explanations of the causes of the ascent of the sap.

know neither the cause of this irritability, nor in what this vital power consists. The ascent of the sap is in a degree owing to *capillary attraction*, assisted by heat; the vessels containing this fluid are very small tubes, no larger than a hair, and in most cases much smaller, since few are visible to the naked eye. Capillary tubes have the property of raising liquids against the laws of gravitation, and with a force proportional to their smallness of diameter;—this law explains in some degree the phenomenon we are considering. We will trace the progress of the sap after it has ascended to the leaves and extremities of the plant. A considerable portion of it is, by pores in the leaf, exhaled in the form of almost pure water, while the particles of various kinds, which the sap held in solution, are deposited within the substance of the leaf. This process is sometimes termed the *perspiration* or transpiration of plants. It is visible in some grass-like plants, particularly upon the leaves of Indian corn. If these are examined before sunrise, the perspiration appears in the form of a drop at the extremity of the leaf; the ribs of the leaf unite at this point, and a minute aperture furnished for the passage of the fluid may be discovered. The sap which remains, after the exhalation by means of the leaves, is supposed to consist of about one-third of that originally absorbed by the root; this remainder possesses all the nutritive particles which had before been divided through the whole of the sap. At this period, an important change in its nature takes place, and one which has its analogy in the animal economy.

122. The elaborated sap is sometimes transparent, at others milky or opake; it has been called *latex*, and the vessels transmitting it *lactiferous*. Although the sap has been compared to the blood of animals, it is, in reality, more like the animal substance, *chyle*.

A considerable part of this chyle is converted into blood, which, passing first into the arteries and then into the veins, is by the latter conveyed to the heart, from whence it passes to the lungs. At each *inspiration* of the breath, oxygen from the atmospheric air is absorbed by the lungs; here uniting with the carbon of the blood, it forms carbonic gas, which is thrown off at every *expiration* of the breath. Thus the carbon, which in the animal system is accumulated by feeding on vegetables, and which requires to be diminished, is carried off; it is said that a person in breathing twenty-four hours, expires almost one pound of carbon, or the basis of charcoal! Let us return to the sap in the leaves of plants, and see whether a change takes place, analogous to that in the animal system. We will consider the sap as bearing a resemblance to the animal chyle, and the leaves to the animal lungs. These vegetable lungs are furnished with pores, by which they, too, inhale gases; but here our comparison fails, since, instead of oxygen, the plant inhales *carbonic acid;* this it decomposes, and converting to its own use the *carbon*, which is an important element of vegetable compounds, it exhales the *oxygen* necessary for the support of animal life. Light, however, is necessary for this process of respiration in the plant; deprived of this agent, vegetables absorb instead of giving off oxygen. The carbon which is deposited in the sap, in order to be fitted for the nourishment of the plant seems to require the further agency of oxygen to convert it into carbonic acid; this is effected by means of the oxygen, which during the night is absorbed by the leaves. At the appearance of light, carbonic acid is again decomposed and oxygen evolved. Besides the oxygen which the plant separates from the carbonic acid inhaled by its leaves, it is undoubtedly furnished with this gas by the decomposition of water, and other substances which are absorbed by the root.

123. The *Cambium* is the sap elaborated by the chemical process carried on in the leaves, and rendered fit for the nourishment of the plant. The descending or elaborated sap having

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Exhalation—Nature of the sap which remains after exhalation.—122. Latex—Sap compared to animal chyle—Analogy in the animal and vegetable system—In what respect does the comparison fail?—What is needed in order to fit the carbon for the nourishment of the plant?—123. Cambium—How conveyed?

undergone in the parenchyma of the leaves the changes we have described, is carried from the leaves into the bark, descending through the tissues, and also flowing laterally along the medullary rays into the stem; or in other words, it is conveyed by a system of vessels between the *liber*, or inner layer of the bark, and the *alburnum*, or young wood; here it contributes both to the formation of an outward layer of new wood and an inward layer of new bark; extending also from the extremity of the roots to the upper extremity of the plant, it furnishes materials for the formation of new buds and radicles.

If a ring be cut through the bark of a tree, the cambium, or *descending juice*, will be arrested in its course, and accumulating around the upper edge of the bark, will cause a ridge or an *annular* protuberance. This vegetable blood being thus prevented from having access to the lower part of the plant, the roots cease to grow, the sap ascends but feebly, and in two or three years the tree dies. If the incision be not made too deep, the wound will soon heal by the union of the disconnected bark, and the circulation of the cambium proceed as before. This experiment proves the importance of this fluid to the existence of the plant.

124. *Proper Juices.*—This division comprehends all the fluids furnished by the plant, except the sap and cambium, as oils, gums, &c. These are the product of the cambium, as, in the animal system, tears are secreted from blood. The secretions carried on by the vegetable glands from the cambium are ot two kinds: 1st, such as are destined to remain in the plant, as milk, resins, gums, essential and fixed oils; 2d, such as are destined to be conveyed out of the plant; these consist chiefly of vapors and gases exhaled from flowers, and may, perhaps, more properly be called *excretions* than *secretions*.

LECTURE XX.

PHYSIOLOGICAL VIEWS.—BARK, WOOD, AND PITH.—GROWTH OF A DICOTYLEDONOUS PLANT.—GROWTH OF A MONOCOTYLEDONOUS PLANT.

125. WE have exhibited the minute discoveries made by the help of the microscope in the *solid parts* of the vegetable substances, and noticed those important *fluids*, the circulation of which appears to constitute the life, and produce the growth of plants. We have now to consider the solid parts already described, as composing the body of the vegetable, and collected under the three forms of *Bark*, *Wood*, and *Pith*.

BARK.—The *bark*, in *exogenous* plants, consists of the *epidermis*, *cellular integument*, and *cortex*.

Importance of this fluid—Effect of cutting a ring through the bark of a tree.—124. Proper juices.—125. Division of the solid parts of the plant—Bark.

Epidermis, or cuticle, is the skin of the membrane which extends over the surface of plants. There is a striking analogy between animal and vegetable cuticle, or skin. In the animal it varies in thickness, from the delicate film which covers the eye, to the thick skin of the hand or foot, the coarser covering of the ox, or the hard shell of the tortoise. In the vegetable it is exquisitely delicate, as in the covering of a rose-leaf; or hard and coarse, as in the rugged coats of the elm and oak. The cuticle serves for protection from external injuries, and regulates the proportion of absorption and perspiration through its pores. It is transparent as well as porous, so as to admit to the cellular integument the free access of light and air, while it excludes every substance which would be injurious.

a. It is to the cuticle of wheat, oat, rye, and some of the grasses, that we are indebted for straw and Leghorn hats. In their manufacture the cellular texture is scraped away, so that nothing remains but the cuticle. It has been ascertained that the outer bark of many of the grasses contains silex, or flint;—in the scouring rush (*Equisetum*), the quantity of silex is such, that housekeepers find it an excellent substitute for sand, in scouring wood or metals. A peculiar property of the cuticle is, that it is not subject to the same changes as the other parts of bodies: it is, of all substances found upon animal or vegetable matter, the most indestructible. The cuticle is sometimes, like the skin of animals, clothed with wool, as in the leaf of the mullein; the pericarp of the peach has a downy cuticle.

126. *Cellular integument* is situated beneath the epidermis or outer skin of the bark; it is filled with a resinous substance, usually green in young plants. It envelops the branches, as well as trunks of trees, and herbaceous stems; it extends into roots, but there it neither retains its green color, nor decomposes carbonic acid gas. It is the seat of color, and in this respect analogous to the *cutis*, or true skin of animals, which is the substance situated under the cuticle, and is black in the Negro, red in the Indian, and pale in the American. This herbaceous envelope of the trunks of trees after a time dries, appearing on the surface in the form of a cuticle, and often cleaves off; it is renewed internally from the cambium.

127. *Cortex.*—Immediately under the cellular integument, we find the true bark, which, in plants of only one year old, consists of one simple layer; but in trunks of older trees, it consists of as many layers as the tree has numbered years. The cortex is formed of bundles of fibers called *cortical vessels*.

The peculiar virtues or qualities of plants chiefly reside in the bark. Here we find the resin of the fir, the astringent principle of the oak, and the aromatic oil of the cinnamon. The *inner layer of the bark* is called the *liber;* from *liber*, a book, on account of its fine and thin layers resembling the

Epidermis—*a.* Uses of the epidermis.—126. Cellular integument.—127. Cortex- Liber leaves of a book. This substance, by its development, produces new roots, branches, leaves, flowers, and fruits.

a. It is composed of a kind of net-work, which has been compared to cloth; the elongated fibers representing the warp, and the cellular texture the filling up. As the cambium descends between the liber and the wood, and a layer of new liber and of new wood are every year formed, the old layer is pushed outward, and at length, losing its vital principle, it becomes a lifeless crust. The natives of Otaheite manufacture garments from the liber of the paper mulberry. The liber of flax is, by a more refined process, converted into fine linen. This part of the bark is important to the life of vegetables; the outer bark may be peeled off without injury to them, but the destruction of the liber is generally fatal. The operation of *girdling* trees, which is often practiced in new countries, consists in making, with an axe, one or more complete circles through the outer bark and the liber of the trunk. Trees seldom survive this operation, especially if it be performed early in the spring, before the first flow of the sap from the root toward the extremities.

b. During the repose of vegetation, that part of the liber most recently organized, and which of course retains its vital power, remains inactive between the wood and the outer layers of the bark, until the warmth of spring causes the ascent of the sap. After promoting the development of buds, and the growth of new wood and bark, the liber, like that of the preceding year, hardens and loses its vital energy.

Fig. 125.

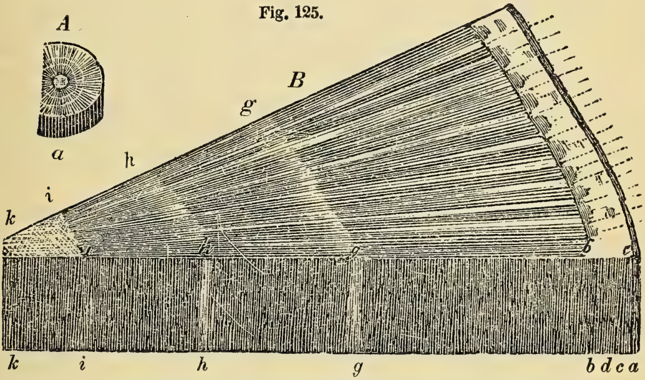

Fig. 125, at A, represents a young dicotyledonous stem, cut transversely; the inner circle surrounds the *pith;* the wood extends to the *bark*, which at *a* appears darkly shaded.

At B, is a section of the same stem magnified; *a b* is the bark, *b i* the wood, and *i k* the pith.

The divisions of the bark may be seen as follows: *a c* represents the *cuticle*, or the dry, disorganized part; at *c d* is the *cellular integument;* at *d b* is the *cortex* the extreme part of which, at *b*, is the liber.

128. Wood. The wood (*lignum*) of exogenous stems consists of two parts, *alburnum* or *sap-wood*, and *perfect wood.* The *alburnum* is so called from *albus*, white, on account of the paleness of its color. This is the newly formed wood, and constitutes the outer part of the woody substance of the plant. It is at first soft and tender, and in this state appears to be active

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a. Liber annually renewed—Girdling—*b.* What ultimately becomes of the liber ?—128. Wood Alburnum.

with the principle of life. As the liber is formed annually from the cambium or descending sap, new layers of alburnum are supposed to have the same origin, and to be formed during the same intervals of time. Most of the sap ascends through the alburnum, though some passes through the perfect wood. The sap which nourishes the buds passes through the center of the stem, and from thence is conveyed in appropriate vessels to the buds.

129. The *perfect wood* is also called the *heart-wood*, or *duramen;* its color is usually darker than that of the sap-wood, and its texture is firmer and more compact; it is also more durable for timber. It is formed by the gradual concentration and hardening of the alburnum. The wood constitutes the greater part of the bulk of trees and shrubs; when cut across, it is found to consist of numerous concentric layers. It is supposed that one of these circular layers is formed every year. To prove that the wood is deposited externally from the cambium, pieces of metal have been introduced under the bark of trees that were growing, and the wounds carefully bound up; after some years, on cutting them across, as many layers of new wood have been found on the outside of the metal, as years had elapsed since its insertion. The strength and hardness of wood is owing to woody fibers extending longitudinally; these fibers are chiefly of vascular texture, and contain sap, and the various secreted juices; some contain only air.

For illustration of the formation of wood, see Fig. 125, B, which represents a section of a woody stem of three years' growth; *i k*, next the pith (*i k*), is a layer of the first year's growth, and the hardest part of the wood; *h g* is a layer of the second year's growth; and *g b*, of the third; the next to this is the sap-wood recently formed from the cambium.

130. PITH. The pith (see Fig. 125, B, *k i*) is situated in the center of the trunk and branches of plants, and is a soft, spongy substance, analogous to the marrow of animals. It is composed of cellular tissue. The cells, which are very large in some plants, are filled with fluids when young, but in old branches the fluids disappear, and the cells are filled with air. In general, herbs and shrubs have a greater proportion of pith than trees; it is also more abundant in young than old vegetables; it extends from the root to the summit of the trunk or stem of the plant.

131. The MEDULLARY RAYS are lines which diverge from the pith toward the circumference; they are fibrous textures interwoven in the wood, the alburnum, and the different layers of the bark. The new buds originate from the points at which

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129. Perfect wood—How has it been proved that wood is deposited externally?—Strength and hardness of wood, to what owing?—Illustrate the formation of wood by a reference to Fig. 125.—130. Pith
131. Medullary rays.

they terminate. The pith has been compared to the spinal marrow in animals; it appears to be an important part of the vegetable substance, though its offices are perhaps less understood than those of the other parts. The letter *e*, Fig. 125, represents the *medullary rays* as proceeding from the pith, and terminating in the cellular integument.

132. We are not to expect that every stem or branch of a dicotyledonous plant will present all the various parts described as constituting the vegetable body; neither when they exist are they always distinct, for they often pass into each other in such a manner as to render it difficult to define their boundaries. Many species of plants have no distinct layers of bark, and in many others there is such a similarity between the alburnum and perfect wood as to render it difficult to distinguish them.

Growth of a Dicotyledonous Plant.

133. Let us now review the most important circumstance in the growth of a *woody* plant. Before germination the substance of the plumula exhibits a delicate and regular cellular tissue, and where the liber and medullary rays are to be formed, traces of cambium appear. When the germination commences, the vascular system begins to organize around the pith, and the medullary rays to form; the extremities of these rays exhibit cellular tissue, which is soon converted into liber. (See *f*, Fig. 125, which shows the extremities of the medullary rays, and the points where the liber is formed.) While this change is taking place, the cambium, which may be considered a fluid cellular mass, flowing between the bark and the wood, hardens into a new *layer of liber*, and a *new layer of alburnum*—the latter hardens still more, and becomes *perfect wood;* these new layers are formed each year, and thus the growth of the vegetable goes on until death completes its term of existence. *Each layer of wood is, generally, the product of one year's growth;* but it is only near the base of the trunk that the number of layers of wood is a criterion of the age of the tree; for in trees where one hundred layers may be counted near the base, no more than one can be found at the extremity of the branches. These layers, then, do not extend through the length of the tree; but while the base exhibits all the layers which have been formed, the extremity of the branches contains under the bark only the continuation of an annual layer. The age of branches may be determined by the number of layers of wood at the base of each branch.

134. We will now consider the manner in which the tree in-

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132. Various parts not always distinct in different plants.—133. Appearance of a dicotyledonous plant before germination—Change—Process in the formation of perfect wood—Number of layers of wood near the base of the trunk, a criterion of the age of a tree—How may the age of branches be determined?

creases in hight. A seed germinates; the plumule rises, an axis is developed, with its nodes which throw off branches; the cambium performs its office, but gradually becomes less capable of extension, and when it is converted into wood its circulation ceases. The layer of wood then exhibits the form of an elongated cone; at the summit of the cone a bud is formed, from which a new shoot issues; a new layer of alburnum organizes upon the surface of the cone; this, in turn, becomes perfect wood, covering the layer first formed; and thus the tree goes on increasing in hight and in diameter. The terminal bud is formed each successive year. After a hundred years of vegetation, a hundred cones might be found boxed within each other; the spaces comprised between the summits of the cones would show the succession and elongation of the annual shoots. As the wood is formed by the conversion of cambium into alburnum, so from the same fluid the inner layers of bark are formed to renew the waste occasioned by the destruction of the epidermis. While the wood is growing externally, that is, at an increasing distance from the center, the bark is forming internally, and the new layers are pressing outward.

Growth of Monocotyledonous Plants.

135. The growth of trunks as hitherto considered has relation only to *woody* plants;—but between plants which grow from seeds with one cotyledon, and such as grow from seeds with two cotyledons, there is a great difference as to the mode of organization and growth. Their stems, on account of their different modes of growth, have been distinguished into *endogenous*, signifying to grow inwardly, and *exogenous*, signifying to grow outwardly. The discovery of the different modes of growth in these two great divisions of plants constitutes an important era in vegetable physiology. The stems of *monocotyledonous* or *endogenous* plants have seldom a bark distinct from the other texture; they have neither liber nor alburnum disposed in concentric layers; they have no medullary rays; and their pith, instead of being confined to the center of the stem, extends almost to the circumference. The wood is divided into fibers running longitudinally through the stem (see Fig. 126, where the dots

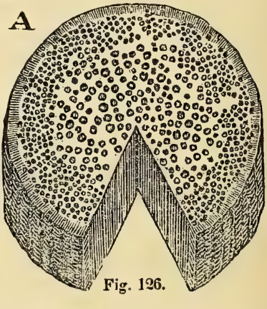

Fig. 126.

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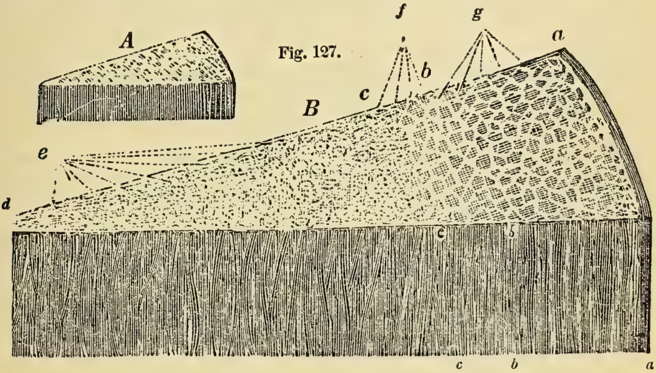
134 Describe the manner in which the tree increases in hight.—Difference in the growth of wood and bark.—135. Difference in the growth of plants of the two great classes.—Describe the growth of the endogenous stem.

represent the fibers); each of these fibers seems to vegetate separately, they are ranged around a central support and are so disposed that the oldest are crowded outwardly, by the development of new fibers in the center of the stem; this pressure causes the external layers to be very close and compact. This mode of increase, little favorable to growth in diameter, produces long and straight stems, nearly uniform in size throughout their whole extent; as the palms and sugar-canes of the tropics, and the Indian corn of our climate.

Fig. 127, at A, represents a section of the stipe or stem of a palm-tree; at B, is the same magnified; *a b* shows a part of the stipe in which the woody fibers are most dense and hard; *b c* shows the fibers less numerous, less compact, and less hard; *c d* includes the woody fibers, tender and scattered; the orifices of tubes which have disappeared are seen at *c a*. In the part *c d* the cellular tissue occupies a greater space than at *c b*, and much more than at *b a*, where the woody fiber, or vascular texture, predominates. The fibers at *e* are of new formation; at *f* they are older; and at *g* still more ancient; thus the development of the wood in this plant proceeds inversely to that of dicotyledonous plants.



136. Endogenous plants continue to increase in hight long after they cease to grow in diameter; the stem is gradually extended upward by new terminal shoots, which are formed annually. The epidermis is formed of the foot-stalks of leaves, which annually sprout from the rim of a new layer of wood; the leaves falling in autumn, their foot-stalks become indurated, and remain upon the outer surface of the plant.

137. By attention to the vegetable structure the young may be induced to think more upon the wonderful mechanism of their own material frames, upon the analogy and yet infinite difference between themselves and the lilies of the field. In considering these things we are led to exclaim, in the language of the Psalmist, "Oh Lord, how manifold are thy works! in wisdom hast thou made them all!" The human body is nourished by the same elements as the grass which perisheth; the flowers have a much more refined corporeal substance, but how much more precious are we in the sight of the Almighty! Do we ask why we are of

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What is Fig. 127 designed to illustrate?—136. Endogenous stem increasing in hight.—How is the epidermis formed?—137. Reflections on the analogies between the vegetable and animal substances.

more value "than the lilies of the field," or than "many sparrows?" It is the very principle within us which enables us to make this inquiry that renders us thus precious;—it is the soul that raises us above the inanimate and brute creation; and though the body is sister to the worm and weed, the soul may aspire to the fellowship of angels.

138. The principal differences between Exogenous and Endogenous plants, so far as they depend upon the structure of the stem, may be exhibited as follows:

EXOGENOUS PLANTS.	ENDOGENOUS PLANTS.
TRUNK *conical, generally branched.*	TRUNK *usually simple and cylindrical.*
BARK *separable from the stem, made up of annual layers; in old trunks, cracked or broken into fissures externally.*	RIND *smooth, not made up of concentric layers; inseparable from the stem.*
WOOD *composed of concentric zones, traversed by medullary rays, with a distinct central pith.*	WOOD *consists of fibrous and vascular bundles, not arranged in concentric layers; no distinct pith, no medullary rays.*
STEM *increases in diameter by the successive addition of new woody layers externally; consequently, the oldest and densest part of the stem is near the center.*	STEM *increases in diameter by the formation of new woody bundles within the old wood; consequently, the oldest and densest portion of the stem is at the circumference.*
Duration of the trunk indefinite; it is destroyed only by disease and external causes.	*Duration and increase of the trunk confined within certain limits; life terminable from the solidification of its tissue.*
ROOT *conical, destitute of pith and spiral vessels.*	ROOT *cylindrical, of the same structure as the stem; sometimes furnished with spiral vessels.*
Native, as trees in all climates.	*Native, as trees only in hot climates.*

LECTURE XXI.

PHYSIOLOGICAL VIEWS.—CHEMICAL COMPOSITION OF PLANTS.—PROXIMATE PRINCIPLES.—CHEMICAL ANALYSIS OF THE SAP.

139. WE have, according to our method of arrangement, considered *vegetable anatomy in connection with physiology:* that is, when treating upon each particular organ, we have remarked upon its functions in the *life* and *growth* of the whole plant. Yet, although we have attempted to show how plants *grow*, it is not easy to explain how they *live*. *The great principle which* operates in organic life is not laid open to the eye of man. The physician who spends a long and laborious life in the study of the human frame, can give only the result of his *observation*. He finds a certain article efficacious in the relief of a particular disease, but he knows not *why* this should be so; or if he be able to give some reasons, he is ultimately arrested in his speculations by a barrier which he cannot pass.

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138. Differences between Exogenous and Endogenous plants.—139. Connection of vegetable anatomy and physiology.

140. Before closing our view of the vegetable structure we will by the aid of chemistry examine the elements which compose it. The growth of vegetables, with the increase of their weight, shows that they imbibe some external matter which is incorporated into their own substance. This constitutes *nutrition*, and distinguishes living substances from dead matter. A stone does not receive nourishment, although it may increase by an external accumulation of matter. "Vegetable substances, analyzed by a chemical process, have been found to contain *carbon*, *oxygen*, *hydrogen*, and sometimes *nitrogen*, *sulphur*, *silex*, the *oxide of iron*, *soda*, *magnesia*, and *chalk*."* These, by the agency of the root, stems, and leaves of the plant, are derived from the earth, air, and water.

a. Proximate Principles.—Vegetation produces chemical combinations which are distinguished by the name of *proximate principles.* Although the proximate principles of plants are very numerous, but few of them are well known; they are the result of the action of the vital forces of plants, and are, therefore, important subjects of investigation to those who pursue the study of physiological botany to any great extent. *Carbon*, *oxygen*, *hydrogen*, and *nitrogen* are the most important of the *ultimate* elements of plants, and the constituent parts of their proximate principles. These principles may be divided into two classes. I. Those principles which are composed of *carbon*, *hydrogen*, and *oxygen*, without any nitrogen. II. Such as contain, besides the substances belonging to the other class, some *nitrogen.* There are few of this class.

b. The FIRST CLASS of proximate principles is divided into *three orders.* 1st. Principles which have more *oxygen than sufficient to form water.* 2d. Principles in which oxygen and hydrogen exist *in the exact proportion to form water.* 3d. Principles where *hydrogen is in excess.*

c. The 1st order includes *vegetable acids;* as, *Acetic* acid, or pure vinegar; this is generally produced by fermentation from wine, cider, and some other liquids; it is also found in a pure state in Campeachy wood, and the sap of the elm. *Malic* acid may be extracted from green apples and the barberry. *Oxalic* acid is found in several species of *sorrel* belonging to the genera *Oxalis* and *Rumex. Tartaric* acid is obtained from the tamarind and cranberry; this acid, combined with potash, forms what is commonly called cream of tartar. *Citric* acid is found in the lemon; it is mixed with malic acid in the gooseberry, cherry, and strawberry. *Quinic* acid is obtained from the Peruvian bark (*Cinchona*). *Gallic* acid is obtained from the oak and sumach; it is highly astringent. *Benzoic* acid is found in the Laurus *benzoin* and Vanilla; this is highly aromatic; it is thought to give the agreeable odor common to balms. *Prussic* acid gives out a strong odor like bitter almonds; it is an active poison; it is obtained from peach-meats and blossoms, from bitter almonds, &c.

d. The 2d order includes *gum*, *sugar*, &c. *The Gums.* Of these there are many kinds; they have neither taste nor smell; dissolved in water, they form a mucilage more or less thick. The principal gums are, *Gum Arabic*, which flows from the plant MIMOSA *nilotica;*† *Common Gums*, such as issue from the peach-tree, the cherry-tree, and many other plants. *Sugar* is a substance which dissolves in water, and has a sweet taste; it is obtained from the sugar-cane, sugar-maple, from the stalks of Indian corn, pumpkins, beets, and sweet apples. All vegetables which have a sweet taste may be made to yield sugar. Starch is a general product of vegetables; it may be converted into sugar.

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* Mirbel, "Elemens de Botanique."

† By some writers called ACACIA *arabica.*

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140. The plant chemically considered—*a.* Proximate principles—Proximate principles divided into two classes—*b.* First class divided into three orders—*c.* First order—*d.* Second order—*e.* Third order.

e. The 3d order includes *oils, wax, resins,* &c. *Oils* are fluid and combustible substances, which do not unite with water; they are divided into *Fixed* and *Volatile.* The fixed oils are thick and have little odor. The oil of sweet almonds and *olive-oil* grow thick and opake by being exposed to the air. The *Oil of Flaxseed,* called linseed oil, and some other oils, dry without losing their transparency; it is this quality which renders linseed oil so valuable to painters. The *Volatile oils* are distinguished from the fixed oils by their aromatic odors, and their tendency to fly off, from which circumstance the term *volatile* is derived. Among these oils are those of the orange, lavender, rose, jasmine, peppermint, and wintergreen. They are sometimes greatly reduced by being mixed with alcohol, and are then called *essences.* The volatile oils may be found in a great variety of plants, particularly those of the Labiate family. The *Aroma,* or *aromatic property,* consists chiefly of the odors which are exhaled from plants containing volatile oil; to this oil is owing the aromatic odor of the ginger-plant, of the myrtle, rose, and other sweet-scented plants. Aromatic plants are much more common in hot than cold countries; most of the aromatic spices are found in the equatorial regions. *Wax* is found on the surface of the fruit of the bayberry (MYRICA *cerifera*). Beeswax, though an animal production, is made by the bees from the pollen of plants. *Camphor* has much analogy with the volatile oils; it is an extract from the LAURUS *camphora,* or camphor-tree of Japan. RESIN exudes from the pine, and some other trees; it is dry, insoluble in water, but soluble in alcohol, and very inflammable. The people in new countries often use, as a substitute for lamps, pine-knots, which, abounding in resin, burn with a bright flame. The difference between resin and the volatile oils appears to consist in the action of oxygen upon the former; for the oil in absorbing oxygen from the air passes into the resinous state. *Resins* mixed with volatile oils form *balsams;* they are thick, odorous, and inflammable substances, as the balsam *copaiva,* and the balsam of *Tolu.* These resins are sometimes mixed with gums; they are then called *gum-resins.* Of this kind are gamboge, asafœtida, guaiacum, and aloes, an extract from the ALOE *perfoliata.* These gum-resins in flowing from vegetables are sometimes white and liquid like milk, but they usually become brown and hard by exposure to the air. *India-rubber,** or, as it is sometimes called, gum-elastic, is the product of a South American tree (SIPHONIA *elastica*), an East Indian plant (the URCEOLA *elastica*), and some other trees in the equatorial regions; by exposure to the air the gum hardens, becomes brown, and takes the appearance of leather; it can neither be dissolved by water nor alcohol. The juice of the milk-weed is said to be similar to that of the plants from which the India-rubber is obtained.† *The green principle* (*Chlorophyl*).—It is to this principle that all the green parts exposed to light owe their color; *chlorophyl* undergoes changes in the different states of the plant, in autumn becoming brown or yellow. The change of color is attributed to the action of oxygen, into the formation of an acid.

141. The *second class* of proximate principles consists of substances which, like the first class, are formed of carbon, hydrogen, and oxygen; but to these is added *nitrogen.* We here find: *Opium,* a narcotic principle extracted from the poppy; it is soluble in alcohol, slightly in water. *Hematine* is the coloring principle from the Campeachy wood. *Indigo* is a coloring substance, obtained from several species of *Indigofera,* or indigo plant. *Gluten* is extracted from the cotyledons of the seeds of *leguminous* plants, as peas, beans; and from the albumen of wheat, rye, &c. It is obtained by separation from the starch. Flour owes much of its nourishing properties to gluten, which, in some respects, is analogous to animal principles, being, like them, subject to putrefaction. *Jelly* is the thickened juice of succulent fruits, as currants, quinces, and apples; it is soluble in hot water,

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* Caoutchouc.

† Mr. H. Eaton informed me that he prepared a small quantity of the juice of the milk-weed (Asclepias) in such a manner that it could not be distinguished from the imported india-rubber either in external appearance or in properties.

What substances belong to the third order of the first class of proximate principles?—Describe the different vegetable oils—What causes the aroma of plants?—Wax—Camphor—Resins—India-rubber—Chlorophyl.—141. What new element is found in the second class of proximate principles? What substances are found in this class?

though scarcely so in cold; when heated, it loses its jelly-like form, which is that of a coagulated mass susceptible of a tremulous motion; by too long boiling the juice loses this property, which gives to jelly its peculiar appearance. Many coloring principles have never been separated from the substances to which they are united; as those of saffron, logwood, &c. It has already been suggested, that the red color of fruits arises from the combination of an acid (or of oxygen, the great acidifying principle) with a blue coloring principle. Every beginner in chemistry knows that the effect of mixing an acid with an infusion of blue violets or any vegetable blue, is to give a red tinge, varying in shade from a purple red to a brilliant scarlet, in proportion to the quantity of acid. It has been supposed, upon the same principle, that the purple, red, and blue coloring of the petals of flowers is owing to different proportions of acid; this may explain the change of color which appears in some flowers, which pass from blue to red, as the *changeable hydrangea.* This change may be attributed to increase of acid,[*] combining with the blue coloring principle. Some red flowers become blue; they are in this case supposed to have parted with some portion of the acid which was united with their coloring principle. White is most common in roots, sweet berries, and the petals of spring flowers; black in roots and seeds; yellow in anthers and the petals of compound flowers; red in the petals of summer flowers and acid fruits; blue and violet in the petals; green in the leaves and calyx.

142. *Chemical Composition of the Sap.*—The sap is a transparent, colorless fluid, imbibed by the vegetable from the earth and air; or more properly, from the water existing in them, which holds in solution *oxygen, hydrogen, carbon, nitrogen, earths, mineral salts,* and *animal* and *vegetable matter.* We might suppose that being derived from the same source the sap in all vegetables would be alike, but it is never obtained pure; it is more or less mingled with the *proximate principles,* or proper juices, and thus differs in different species of vegetables; water however, constitutes the principal part in all. Sap of the *elm* (ULMUS *campestris*) has by analysis been found to contain water, volatile matter, acetate of potash, carbonate of lime, vegetable matter, sulphate of potash. *Sap of the beech* (FAGUS *sylvatica*) contains water, acetate of lime, with excess of acid, acetate of potash, gallic acid, tannin, mucous extract, and acetate of alumine. *Sap of the horse-chestnut* (ÆSCULUS *hippocastanum*) contains water, extractive mucous matter, niter, acetate of potash, and carbonate of lime.[†]

143. Though it seem wonderful that of so few elementary substances such a great variety should exist in the taste, smell, color, consistence, medicinal and nutritious qualities of vegetable combinations; it is equally wonderful, that with the nine digits and the cipher, we may make such varied combinations of numbers; or with our twenty-six letters of the alphabet, form every variety of composition. Thus, *by various combinations of a few simple principles, are formed all vegetable and animal productions.* The presence of nitrogen was formerly considered as a test of animal substance, and the want of it of a vegetable substance; but it is now ascertained that animal substances may exist without nitrogen, and that this principle is contained in several vegetables. The *elements of the compounds being the same,* the question naturally arises, What causes the *great diversity in the properties?* Two causes may be assigned for this, viz.: 1st, The *different proportions in which the elements are combined;* 2d, The *various modes of their combination.* In vinegar and sugar, the one substance a liquid and of a sour taste, the other solid and sweet, are found the same elements in *different proportions* and *differently combined.* In gum, starch, and sugar, the *elements are the same,* the *proportion nearly the same,* but *they are combined differently.*

144. When we know by chemical analysis the combinations which exist in inorganized bodies, we can often form similar substances by putting the same to

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[*] Iron is supposed to be combined with the oxygen of the acid.

[†] These results of the analysis of sap are extracted from Vauquelin.

Cause of the color of fruits, petals, &c.—142. Sap considered chemically—Sap of the elm—Of the beech—Of the horse-chestnut.—143. All vegetable and animal productions composed of a few simple principles—Illustration—What two causes assigned for the different properties of compounds formed from the same elements?—144. Organized bodies not produced by the skill of man.

gether; but we cannot thus form organized bodies, for to these belongs a living principle, which it is not in the power of man to bestow. It is said that Rousseau, skeptical in science as in religion, declared he would not believe in the correctness of the analysis of vegetable or animal substances, until he should see a young nimal, or a thrifty plant, spring into existence from the retort of the chemist. But the power to *create* the Almighty has not delegated to man; neither is it to be supposed that any future discoveries in science will ever confer it upon him. To study the compound nature of substances, to classify, arrange, and by various combinations to beautify the world of matter, to cultivate the faculties of mind, until, stronger and brighter, the mental vision sees facts and principles before invisible,—these are the high privileges bestowed on man;—but to *add one new particle to matter, or one new faculty to the mind, is beyond the power of the whole human race.*

PART III.

CLASSIFICATION.

LECTURE XXII.

METHOD OF TOURNEFORT.—SYSTEM OF LINNÆUS.—NATURAL METHODS.—METHOD OF JUSSIEU.—COMPARISON BETWEEN THE CLASSIFICATIONS OF TOURNEFORT, LINNÆUS, AND JUSSIEU.

145. Let us now imagine the whole vegetable kingdom, comprising innumerable millions of individual plants, to be spread out before a Botanist. Could he, in the course of the longest life, number each blade of grass, each little moss, each shrub, or even each tree? If he could not even count them, much less could he give to each one a separate *name* and *description*. But he does not need to name them separately, for nature has arranged them into *sorts*, or *kinds*. If a child were sent into the fields to gather flowers of a *similar kind*, he would need no book to direct him to put into one parcel all the *red clover* blossoms, and into another the *white clover;* while the *dandelions* would form another group. These all constitute different *species.* Nature would also teach the child that the red and white clover, although differing from each other in some particulars, yet bear a strong resemblance. By placing these kinds together we form a *genus,* and to this *genus* we refer all the *different kinds* or *species* of clover.

146. The whole number of *species* of plants which have been named and described, including many which have been recently discovered in New Holland and about the Cape of Good Hope, is said to be more than 100,000. If species of plants were described without any regular order we could derive neither pleasure nor advantage from the study of practical botany. When we wished to find the name of a plant we should

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145. Nature arranges plants into kinds or sorts—Examples.—146. Number of species of plants—Necessity of order in description.

be obliged to turn over the leaves of our books without any rule to guide us in the search.

147. Previous to the time of Linnæus, Tournefort, of France, had published an ingenious method of arrangement, beautiful by its simplicity, but imperfect, on account of the vagueness of its application. The characters of his classes were founded upon the *absence*, *presence*, and *form* of the corolla.

Synopsis of the Method of Tournefort.

HERBS.

FLOWERS PETALOUS, simple.	Corollas monopetalous.	Regular.	1. *Bell-form.*
			2. *Funnel-form.*
		Irregular.	3. *Personate.*
			4. *Labiate.*
	Corollas polypetalous.	Regular.	5. *Cruciform.*
			6. *Rosaceous.*
			7. *Umbelliferous.*
			8. *Caryophyllous.*
			9. *Liliaceous.*
		Irregular.	10. *Papilionaceous.*
			11. *Anomalous.*
		Compound.	12. *Flosculous.*
			13. *Semi-Flosculous.*
			14. *Radiated.*
FLOWERS APETALOUS.			15. *Apetalous, with stamens.*
			16. *Apetalous, without stamens.*
			17. *Apetalous, without visible flowers or fruit.*

TREES.

FLOWERS APETALOUS.		18. *Trees apetalous.*
		19. *Trees amentaceous.*
FLOWERS PETALOUS.	Corollas monopetalous.	20. *Trees with monapetalous flowers.*
		21. *Trees with rosaceous flowers.*
	Corollas polypetalous.	22. *Trees with papilionaceous flowers.*

a. The first step in this classification, or the separation of shrubs and trees, was wrong. The distinction between a small tree and shrub cannot be accurately settled. Two circumstances were by Tournefort relied on as a foundation for this distinction: first, that *shrubs do not form buds* for the future year; and secondly, the *difference in size of trees* and *shrubs.* With respect to the *formation of buds*, the distinction is not found to be invariable, as some shrubs do form buds, and some trees do not. As *to size*, the variation, even in the same species, is such in different soils and situations, that it cannot be admitted as a mark of distinction. Different species even in the same genus sometimes differ in their *stems;* some being woody and others herbaceous. Neither is the *form of the corolla* to be depended on; even in the most natural families of plants we find flowers of different forms; as in different species in the natural order Solaneæ, where the *mullein, is wheel-form; the tobacco, funnel-form; and the atropa, bell-form.*

System of Linnæus.

148. The system* of Linnæus not only includes within it all known plants, but is founded on such principles as must comprehend within it whatever plants may yet be discovered. Its

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* *System* differs from *method* in having but one single primitive character, and in founding its principal divisions upon the consideration of only one single organ or principle. Linnæus founded his system upon the consideration of the *stamens* as more or less numerous, upon their proportion, connection and their absence. Newton founded his system of Natural Philosophy upon *attraction.* The *vital principle* is the foundation of all systems of Physiology. *Method* is not confined to the consideration of one character; it employs all such as are conspicuous and invariable.

147. Attempts at arrangement made before the time of Linnæus—Tournefort's classes, on what founded?—Synopsis of Tournefort's method—*a.* Defects in Tournefort's classification.—148. System of Linnæus.

author believed that no plant was destitute of stamens and pistils; but he acknowledged that there were species in which these organs were so small, so obscure, or of such a singular formation as to render it difficult and sometimes impossible to be certain of their existence, except by the *principle of analogy.* Therefore he made the two grand divisions of plants, *Phenogamous*, such as have stamens and pistils *visible*, and *Cryptogamous*, stamens and pistils *invisible;* some later Botanists considering that there are plants with no organs in the least resembling stamens and pistils have termed such *Agamous.*

149. *Species*, *genus*, *order*, and *class*, are abstract terms denoting certain distinctions which would equally have existed, although we had never observed them or given them names. An *Individual plant is an organized being*, *complete in its parts*, distinct and separate from all other beings. An oak, a rose, and a moss, are each of them individuals of the vegetable kingdom. A *Species includes such individuals as agree in certain circumstances of the roots*, *stems*, *leaves*, *and inflorescence.* We have no reason to suppose that any new species either of animals or vegetables have been produced since the creation. We sometimes see *varieties* in plants made by cultivation; the stamens and pistils, from excess of nourishment, and contrary to the normal process, expanding into petals. Varieties are also occasioned by strewing the pollen from one species upon the stigma of another; but such plants do not produce perfect seeds, and therefore cannot reproduce themselves. Color, taste, and size, are not considered as marks of specific difference.

150. A *Genus comprehends one or more species* grouped together on account of some resemblance in situation, proportion, and connection of the organs which constitute the flower. *Any one species of a genus may be regarded as a type* or example of the others; we may easily refer species which we have not studied to their proper genus by a knowledge of any one species of that genus. Some genera appear to be distinctly marked by nature; the various species of the rose form a beautiful genus.

a. The *generic names of plants* are derived from various circumstances; in some cases from a peculiarity in the form or color of the corolla, or some property of the plant; and some are named from distinguished persons. Thus, Iris is named from Iris the rainbow, on account of its various shades of color. Digitalis is named from *digitus,* a finger, on account of the shape of its corolla, like the finger of a glove. Convallaria (lily of the valley) is named from a Latin word, *convallis,* signifying, in the valley. The name of the great Linnæus is commemorated in a beautiful little flower, called the *Linnœa borealis.** *Specific names* are *adjec-*

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* ***Borealis***, signifying ***northern***, has reference to the situation of the country which gave birth to Linnæus. The Linnæa borealis is not uncommon in New England, and has been found on Green Island, in the Hudson, near Troy.

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149. The terms species, genus, &c.—An individual—A species.—150. What is a genus?—A knowledge of one species enables us to recognize all other species of the same genus—*a.* Derivations of generic names—Specific names.

ives generic names are *nouns.* The specific name sometimes indicates the number of leaves, as ORCHIS *bifolia* (two-leaved orchis); or the color of the corolla, as VIOLA *tri-color* (three-colored violet); or the form of the root, as SOLANUM *tuberosum* (with a tuberous root). *Specific names* are often derived from the names of persons: thus, a species of Origanum is named *tournefortii,* after its discoverer, Tournefort. Generic names are commenced with a capital letter: specific names are not thus distinguished, but are usually in italics, being Latin words.

151. After having analyzed a number of plants, the student will naturally begin to observe a striking resemblance in many genera, and arrange them in groups without any reference to the artificial class or order where they may have been placed. We thus form *Natural families.* If the whole vegetable kingdom could thus be distributed into natural tribes, we should need no artificial system. But we find genera whose relation to other genera seems doubtful or obscure, and there are many plants which seem to have few natural alliances with other plants.

152. The *resemblances which give rise to natural families,* are—resemblance in *seeds;* in *pericarps,* or the envelopes of seeds; in *stamens* and *pistils;* in *corollas* and *calyces;* in the *modes of inflorescence,* or the manner in which the flowers grow together upon the stalks; in *leaves;* in *roots;* and in *stems.* The physician is chiefly conversant with the *natural characters* of plants, especially with such as are connected by medicinal qualities; he considers one group as *narcotics;* another as *tonics;* another as *stimulants,* &c. The natural method is aided by the artificial system; this enables the student to ascertain the name of a plant, and thus learn its place among the natural orders. For example, suppose a person meets with the plant commonly called stramonium, and wishes to know its character; by the Linnæan System he soon learns its botanical name, *Datura;* and this genus he finds belongs to the natural order, *Solanaceæ,* characterized by qualities of an active and deleterious nature, as the Tobacco, Foxglove, &c. The experienced botanist can often determine at sight, by the habit or general appearance of the plant, to what tribe it belongs.

153. Linnæus published in 1738 what he modestly termed "Fragments of a natural method," consisting of 58 orders, founded upon the resemblance of plants in their habits, general appearance, or medicinal qualities. A popular Natural method was, after this, proposed by Jussieu, a botanist of Paris, and this has been improved by De Candolle of Geneva, and by Lindley, Professor of Botany in the University of London. The characters employed in this method are, *The structure of the Seed, with respect to cotyledons; insertion of the Stamens; absence and*

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151. Natural families.—**152.** Resemblances which give rise to natural families—Connection between the natural and artificial methods—Experienced botanists know plants by their habits.—**153.** Natural method of Linnæus—Method of Jussieu—Characters employed in Jussieu's method.

presence of the Corolla; union, or separation of Stamens and Pistils (*Monoclinous*, stamens and pistils on the same corollas; *Diclinous*, stamens and pistils on the different corollas); union or separation of *anthers.*

Synopsis of Jussieu's Method.

ACOTYLEDONS, Stems *acrogenous.*					CLASS 1.
MONOCOTYLEDONS, Stems *endogenous.*		Stamens	*hypogynous,*		2.
		"	*perigynous,*		3.
		"	*epigynous,*		4.
DICOTYLEDONS. Stems *exogenous.*	*apetalous,*	Stamens	*epigynous,*		5.
		"	*perigynous,*		6.
		"	*hypogynous,*		7.
	monopetalous,	Corolla	*hypogynous,*		8.
		"	*perigynous,*		9.
		"	*epigynous,*	anthers combined,	10.
				anthers distinct,	11.
	polypetalous,	Stamens	*epigynous,*		12.
		"	*hypogynous,*		13.
		"	*perigynous,*		14.
	diclinous.				15.

These classes were at first formed of one hundred orders; under the present modifications of Jussieu's method by Lindley and others, they have been multiplied by establishing new orders of genera which could not be included in any of the former established orders.

154. The *acotyledons* include the cryptogamous plants of Linnæus. They are called *Cellulares*, from their being formed of cellular tissue without a vascular system; and are also called *flowerless plants.** Their leaves are destitute of veins. They have no seeds with cotyledons, but are reproduced from a powder-like substance, called *spores*, exhibiting nothing of the parts which constitute the seeds in other divisions of the vegetable kingdom. The *monocotyledons* constitute a portion of the phenogamous plants; they consist principally of grasses, palms, and liliaceous plants; they are *endogenous* as regards the structure of their stems and branches;—the veins in their leaves are straight and parallel. This division consists of two large groups:—1st, plants whose flowers have perianths, called *Petalloidæ*, as the iris and lily; the calyx and corolla being in three, or six divisions;—2d, where, instead of a proper calyx and corolla, the stamens and pistils are surrounded with glume-like bracts; these are called *Glumaceæ;* as in the grasses. The *dicotyledons* include the greater portion of the phenogamous plants; these are *vascular* in their structure, *exogenous* in their mode of growth, and their leaves are distinguished by *branching*, *reticulate* veins.

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* It was long asserted by botanists that every plant had a flower, although it might be invisible but the term *flowerless* is now adopted by many for the cryptogamous family.

Synopsis of Jussieu's method.—154. What are the general characteristics of acotyledons?—Of monocotyledons?—Of dicotyledons?

155. We have found that Tournefort considered chiefly different aspects and circumstances of the *corolla ;*—Linnæus, of the *stamens* and *pistils ;*—Jussieu, of the *cotyledons*, and *insertion* of the stamens. Tournefort's system was defective, as the forms of corollas are often indefinite, and blend into those of an opposite character; that of Jussieu appears too abstract to be used independently of the aid of some more simple method ;—the *number of cotyledons*, though a definite and important character, cannot, in many cases, be determined without the slow process of waiting for the seeds to germinate; the *insertion* of stamens and of the corolla often appears doubtful, even to the experienced botanist. The *characters* used in the system of Linnæus are *apparent*, referring to the *number* of parts, rather than to their *forms* or *insertion;* this offers to the mind something *positive*, which is not found in any other method. Between a corolla *bell-form* or *funnel-form* there are many *intermediate forms*, which may be as much like one as the other. The insertion *over* the germ or *under* the germ is distinct, but the insertion *around* the germ sometimes blends with one, sometimes with the other mode. But, *between one* or *two stamens*, or *one* or *two pistils*, there is no intermediate step or gradual blending of distinctions.

The Linnæan system, in *practice*, is by no means perfect. In treating of the classes in detail, we shall point out cases in which it widely separates plants similar in appearance and properties, and brings together, from the mere circumstance of similarity in stamens, plants wholly unlike in other respects. The improvements of Lindley and other botanists upon the method of Jussieu, we shall hereafter consider.

LECTURE XXIII.

CHARACTERS USED IN CLASSIFICATION.

156. Linnæus, in his "Philosophy of Botany," established *three kinds of characters* to be used in the description of plants. *Factitious* (or *made*); that which is, by agreement, taken as a mark of distinction; thus, certain circumstances with respect to stamens and pistils are fixed upon for distinguishing classes and orders. Although nature has formed these organs, the arrangement of plants by their means is an invention of man,

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155. Comparative merit of the three methods—System of Linnæus offers something positive—Is not perfect.—156. Three kinds of characters to be used in descriptions of plants.

or *artificial*. *Essential Character;* that which forms a peculiar character of one genus, and distinguishes it from all other genera. *Natural Character;* this is difficult to define, though understood by all: it is the general aspect and appearance of the plant, which enables all persons to make some kind of arrangement of plants in their own minds, although they would find it difficult to explain their reasons for this classification to others.

It will appear from this definition of *natural characters*, that in some respects the so-called *Natural method* is in reality *artificial*, since it depends upon characters which can only be learned and understood by the aid of science; and we must admit that the *genera* which compose some of its orders are often as unlike in habit and in properties as are those which compose the classes of Linnæus.

It is by their natural characters that persons who have no knowledge of the science of *zoology* or the classification of animals are enabled to distinguish ferocious beasts from domestic and gentle animals: they see a sheep or cow without any terror, although that individual one they may never have seen before; for nature teaches them to consider that as resembling other sheep and cows, which are inoffensive. This natural character teaches savages to distinguish among the many plants of the forest those which might subserve their wants, and those which would be injurious. Even the lower grades of animals have this faculty of selecting, by natural characters, nutritious substances and avoiding noxious ones; thus we see the apparently unconscious brutes luxuriating in the rich pastures prepared for them by a benevolent Creator, cautiously passing by the poisonous weed, as if directed by an instinct given them by this Almighty Benefactor.

157. A *natural family*, or order, is composed of several genera of plants which have some common marks of resemblance; and its name is usually founded upon this general character; as *Labiate* and *Cruciform*, which are derived from the form of the corollas; *Umbellate* and *Corymbiferous*, from the inflorescence; *Leguminous*, from the nature of the fruit. In many cases, the family takes its name from a conspicuous genus belonging to it; as the *Rosaceæ*, or rose-like plants; *Papaveraceæ*, or poppy tribe, from *Papaver*, the poppy. *Natural orders resemble artificial orders in being composed of genera*, but the principles on which these are brought together differ widely in the two cases. Many families of plants possess a marked resemblance in form and qualities, and appear evidently as distinct tribes. If the whole of the vegetable kingdom could thus be distributed into natural groups, the study of Botany would be much simplified; but it has already been remarked, that there are many plants which cannot without a forced arrangement be thus grouped.

The artificial system may be compared to a *dictionary;*—though by its use we do not at first find the name for which we seek, and then learn its definition, as we do in dictionaries of terms; but we first learn some of the *characters* of a plant, and with these as our guide, we proceed to find the name. Having ascertained the botanical name, we can easily find to what natural group or order a plant be-

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Natural method not simple—Savages distinguish plants by natural characters.—157. Of what is a natural family composed?—How named?—In what respect do natural families resemble artificial orders?—How do they differ?—Artificial system compared to a dictionary.

longs, and thus learn its habits, medicinal use, and other important particulars. The natural method may be considered as the *grammar* of botany; for between this and the artificial system the same relation exists as between the *grammar* and *dictionary* of a language: it would be idle to attempt to decide on their comparative merits, since both are essential to science.

158. *Rules for classification.**—*All botanical classification results from an* EXAMINATION *and* COMPARISON *of plants.*

Every organic distinction which establishes between individuals any RESEMBLANCE, *or any* DIFFERENCE, *is a character; that is, a sign by which they may be known and distinguished.*

The PRESENCE *of an organ, its different modification, and its absence, are so many characters.*

The PRESENCE *of an* ORGAN FURNISHES POSITIVE *characters—its* ABSENCE, NEGATIVE CHARACTERS.

159. *Positive* characters offering means of comparison, show the resemblances and differences which exist between individuals; those plants in which these characters present but slight differences, should be collected in groups; those in which these characters differ more sensibly, should be separated: here we follow strictly the laws of the mind. But *negative* characters, as they allow no comparison, can only be employed to separate individuals, and never to bring them together. When we say that *plants have seeds with one or two cotyledons;* that they have *monopetalous* or *polypetalous flowers*, and are provided with *stamens* and *pistils*, we point out particulars where *visible* and *striking resemblances may be observed;* these *characters*, then, *are positive*, since they are founded on something real.

When we say that some plants are *destitute* of cotyledon, corolla, stamens, or pistils, we do not establish any real basis for the foundation of a comparison. If we wish to separate plants with monopetalous corollas from such as have polypetalous corollas, this single *character* establishes, at once, the *difference* which exists between the two groups, and the *resemblance* which exists between individuals of each group. Thus, *positive characters possess a great advantage over negative ones;* the latter should never be employed when the former can be used; and in proportion as positive characters can be substituted for negative, the science of botany will be perfected. Positive characters can only be founded upon evident *facts*, and never upon a *presumption of the existence of facts*, derived from analogy; for it is contrary to true philosophy to suffer hypothetical reasoning to usurp the place of direct observation

* These rules are chiefly translated from Mirbel's "Elemens de Botanique."

The natural method considered as the grammar of botany.—158. Rules for classification.—159. Positive and negative characters—Advantage of positive characters over negative—Positive characters founded only upon evident facts.

of facts. *Positive characters are constant or inconstant*;—all seeds produced by plants of the same species have the same structure; all plants which grow from these seeds produce other seeds, similar to those from which they have had their origin; of course the characters derived from the structure of these seeds are *constant.* But among these plants some are large and others small; some may have white corollas, some red or blue; some are more fragrant than others: of course, *size*, *color*, and *odor* offer *inconstant* characters.

160. *All real science in Botany must rest upon constant characters;* therefore these characters are much more important than the others. *Constant characters may be isolated or coexistent.* The petals of the RANUNCULUS *acris* (butter-cup) have a gland in the form of a scale; this character, although constant, is *isolated*, for it is not necessarily connected with any other characteristic trait. The calyx of the *Campanula rotundifolia* (blue-bell) adheres to the ovary; this must of necessity be simple, or without divisions, and the corolla and stamens attached to the interior of the calyx. The character of the adherence of the calyx to the ovary brings in its train several other characteristics; it is then *coexistent*, and is more important than the isolated character.

161. *Two orders of characters are derived from the two great divisions of vegetable organs—those of vegetation and reproduction. The characters of reproduction are numerous and often coexistent; one character serving as an index to many others. It is seldom that plants which resemble each other in their characters of reproduction differ much in their characters of vegetation.* For example, all plants with four *didynamous* stamens attached to a monopetalous, labiate corolla, and four seeds lying uncovered in a monophyllous calyx, have an angular stem, and opposite leaves. On the contrary, it frequently happens that *plants which resemble each other by the characters of vegetation, differ by those of reproduction.* Labiate and caryophyllous plants *agree in having their leaves opposite*, and yet there is *no resemblance in their flowers.* This consideration alone would seem sufficient for establishing the *superior importance of the characters of reproduction over those of vegetation. The seed unites in itself the characters both of reproduction and vegetation.* The *embryo* is the *commencement* of the *new plant*, and *it offers us the first characters of vegetation;* but *its situation in the fruit*, the *number*, *form*, and *consistence* of its *envelope*, *are characters which belong to fructification.*

Different kinds of positive characters.—160. Constant characters, of what kinds?—161. Characters of reproduction and vegetation.

a. In separating or bringing together plants, we should, as far as possible, make use of prominent characters which the eye can see without the help of the microscope; but if experience teach us that the characters most constant and proper for the explanation of physiological phenomena can only be discovered by such aid, it is necessary to resort to this instrument in order to establish the natural relations of plants.

162. It is evident, by the formation of *species*, *genera*, and *families*, that every *species* should offer the *essential characters of the family and genus* to which it belongs; while the marks which distinguish this species from another species of its genus will be such as do not belong to the whole genus or family. The *different genera* in families are also distinguished by characters which do not belong to the whole family; every individual, then, will possess its *specific* character, its *generic* character, and its *family* character. The *specific character* is less important than the generic, as it is mostly founded on the *characters of the organs of vegetation*, which are *isolated*, and less important than the coexistent characters. We often find, in the analysis of plants, a great difficulty in determining their species, from the want of definite marks of distinction. *Generic characters* are mostly of the coexistent kind, and are more valuable than the specific characters. The distinctions of genera are usually much more apparent than those of species; as a rose can be more easily distinguished from a Rubus, than one species of rose from another species. *Families* are grouped together by marks of resemblance found in genera. These *family characters* are, of all others, the most important. In the artificial classes and orders we depend on what we have before termed *factitious* characters. In species, genera, and families, the *essential characters are also natural characters.*

LECTURE XXIV.

USE OF BOTANICAL NAMES.—ARTIFICIAL CLASSES AND ORDERS CONSIDERED IN GROUPS.—CLASSES MONANDRIA AND DIANDRIA.

163. We will examine each *class* of the Linnæan system separately, with the *orders* it contains, and notice some of the most remarkable plants and natural families with which we shall meet in our progress. This system appears to be the best method yet discovered of classing new plants, and of ascertaining the *botanical names* of those which are already known. If in all countries the common names of plants were alike, there would be no need of any other; but the names of plants

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a. In what cases should we make use of characters invisible to the naked eye?—162. Characteristics of species, genera, and natural families.—163. Common names variable.

vary in different languages as much as other terms. Even in the same country, and often in the same neighborhood, the common names of plants are different; but botanical names are the same in all countries: without this uniformity no permanent improvement could be made in the science.

a. Botanical names are chiefly taken from the Greek and Latin; these being the common languages of the learned world. All books on botany were for a long time written in Latin;—the original works of Linnæus are in that language. Although it is necessary to the interests of science that there should be such a medium by which the learned may communicate, it is also highly important to the general improvement and happiness of mankind, that their discoveries should be made accessible to all;—it would be useless to attempt to divest botany of all its technical terms and names borrowed from the dead languages; in doing this we should destroy the science and introduce confusion in the place of order. But such facilities are now offered that every young person can easily become acquainted with the grand outlines of the vegetable world;—and how much are the beauties of nature enhanced when viewed with the eye of a philosopher and the heart of a Christian!

CLASS I.—MONANDRIA, ONE STAMEN.

164. *Order Monogynia, one pistil.*—In the United States we have very few examples of plants of this class; the Hippuris, an aquatic plant, is sometimes found in stagnant water; it is the most simple of all perfect flowers, having neither calyx nor corolla, and but one stamen, one pistil, and one seed. The ovary, in maturing, hardens into a naked seed without any kind of appendages.

Fig. 128.

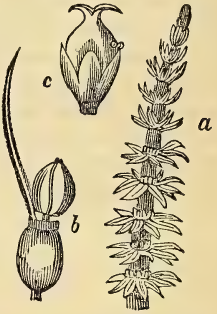

Fig. 128, *a*, represents the Hippuris *vulgaris*;* the stem is *erect* and *simple*; leaves, *linear*, *acute*, and arranged in *whorls*. At *b* is the flower, showing an egg-shaped ovary; a short filament crowned with a large anther composed of two lobes; style long, and awl-shaped, with a stigma acute and inconspicuous; the ovary is crowned by a border which resembles the upper part of a calyx.

165. The Marsh-samphire (Salicornia *herbacea*), with a bushy stem about a foot high and flowers in a short spike, grows in salt marshes near the sea-coast. It has a saltish taste, and is used for pickling. It has been supposed by some that this was the plant alluded to by Shakspeare in his description of the cliffs of Dover:

"How dreadful
And dizzy 'tis to cast one's eyes so low!
Half way down,
Hangs one that gathers Samphire: dreadful trade!"

* Appendix, Plate vi. Fig. 7.

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a Why are botanical names taken from the Greek and Latin?—Why cannot all the terms in botany be translated into common language?—164. Class Monandria—Describe the Hippuris—Fig. 128.—65 Marsh-samphire.

It is probable, however, that the poet here refers to the sea-samphire (CRITHMUM *maritimum*), found on rocks near the sea; this, according to English botanists, is still found upon the Dover cliffs, from which those who gather it are let down in baskets. The Salicornia is found in great quantities on the coasts of the Mediterranean, where it is burned, and its ashes used in the manufacture of soda. It is also found at Onondaga (N. Y.) Salt Springs, and on the sea-coast in some parts of North America. Some of the most valuable vegetable productions of the tropical regions are found in this class. The Arrow-root* (MARANTA *arundinacea*) received its name from having been used by the Indians of South America to extract the venom from wounds made by their poisoned arrows. The root, which is a tuberous rhizome, furnishes the starch-like, nutritious substance called *arrow-root.* The *Curcuma*, sometimes called the Indian Crocus, furnishes from its root the *turmeric* imported from the East Indies; it is remarkable for the peculiar yellow color of its bark, and is valuable as a chemical test of the presence of alkalies: it is an ingredient in the *curry*-powder. The ginger plant was first known to the Arabians, and called by them Zinziber, from whence the natural order *Zingiberaceæ*, distinguished by creeping rhizomes, with simple sheathing leaves having parallel veins proceeding from the midrib to the margin; the *rhizome* of Zingiber *officinale* furnishes the ginger of commerce. The *red valerian* (VALERIANA *rubra*) having but one stamen should belong to this class, according to the normal law in this system; but as other species of this plant have three stamens, this species is carried with the majority into the class Triandria, which is an example of the imperfection of the Linnæan system. Some species of the genus Valeriana are found with five stamens. The root of Valeriana *officinalis* is the medicinal valerian.

166. *Order Digynia, two pistils.*—Contains an American plant, BLITUM (Fig. 128, *c*); its calyx is deeply three-parted; it has no corolla; the ovary resembles a berry; it has two carpels and is crowned by two styles.

CLASS II.—DIANDRIA, TWO STAMENS.

167. *Order Monogynia, one pistil.*—This, though more extensive than the preceding class, is somewhat limited. The lilac (Syringa) is exceeded in beauty and fragrance by few ornamental shrubs. Corolla *salver*-form, or with a tube which spreads out into a flat, four-parted border. We might, at

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* Appendix, Plate iii. Fig. 4.

Arrow-root—Ginger—Valerian.—166. Second Order.—167. Class Diandria—Lilac.

first view, suppose the corolla to consist of several petals, but if we attempt to pull them out, they will all come off together, and we perceive there is but one piece, or that it is monopetalous.* In flowers of one petal, the stamens generally adhere to the corolla; where there are several petals, the stamens are mostly attached to the receptacle. In the lilac the *two stamens* are opposite, adhering to the corolla. The form in which the blossoms are crowded together, forming a large bunch, is called a *thyrse.*

Fig. 129.

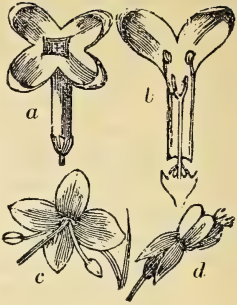

Fig. 129, *a*, represents a flower of the lilac; at *b* is the same, cut lengthwise to show the two stamens. The lilac, although so common with us, is an exotic; the species most cultivated are the *vulgaris*, which has heart-shaped leaves, and the *persica*, or Persian, with narrower leaves. The prim, or privet (*Ligustrum*), is found growing wild in some parts of New England; though, in general, it is seen but little in the United States except when cultivated. It is planted for fences: as it grows rapidly, it soon becomes useful for this purpose, and with its green leaves and white flowers, gives to the farms an air of neatness and taste.

The Sage (*Salvia*) on account of the form of the corolla belongs to the natural family of the *labiate* flowers; such plants are mostly of the class Didynamia, having *four stamens*, two long and two short; but in some cases the labiate flowers have but *two stamens:* this circumstance, according to the Linnæan classification, separates them from their natural family. Two abortive stamens may be observed in this plant, and it should undoubtedly be placed, with other Labiate plants, in the class Didynamia. The species commonly cultivated is the *officinalis*, a shrub-like, perennial plant; to this we give more particularly the name of *sage.* Another species of the same genus is the *sclara*, called Clarry; this has larger and broader leaves than the common sage: it is cultivated for its medicinal properties. A very small plant called Enchanter's night-shade (*Circœa*, Fig. 129, *d*) may be found growing wild in shady places. It has a small white blossom, in the parts of which uniformity as to number may be observed; it has *two stamens*, a corolla with *two petals*, a calyx with *two sepals*, capsule with *two cells*, each of which contains *two seeds.*

168. *Symmetry of structure* observable in the plants described is now considered as a *law* of nature, and when not to be found the case is regarded as a departure from the

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* Gamopetalous (petals united) is the term now applied to such corollas, as it is found they are in reality composed of different pieces cohering together.

Prim—Sage—Enchanter's night-shade.—168. Symmetry of structure.

normal law, caused by some accidental circumstance in the growth and development of the parts of the flower. The number of stamens is frequently half that of the divisions of the corolla: the lilac has *two* stamens, and a *four*-parted corolla. In a plant with three stamens, the number three or six usually prevails in the divisions of the calyx, corolla, capsule, &c. A knowledge of this fact will assist us in determining the class of a plant: for example, if we have a flower whose calyx has *five* or *ten* sepals, and the divisions of the corolla are the same, we may expect, if the flower is a perfect one, to find either *five* or *ten* stamens; or if the divisions of the flower be *two*, there will generally be *two* or *four* stamens; if *three*, either *three* or *six* stamens; if *four*, either *four* or *eight* stamens. The number *five*, as divisions of the calyx, corolla, and capsule, is generally united to *five* or *ten* stamens, and found in the *fifth* or *tenth* class.

a. Another native plant of this class is the *Veronica* (Fig. 129, *c*). Of the seventy species which this genus is said to contain, no more than six or eight are common to North America. The Veronica and the Circæa both turn black when dried; although they do not add to the beauty of an herbarium, they are desirable in a collection of plants, as our country contains few specimens to illustrate the second class of the Linnæan system.

b. Among the exotics of this order we find a singular plant, peculiar to the East Indies, the NYCTANTHES *arbor tristis*, or sorrowful tree; its boughs droop during the day, but through the night they are erect, and appear fresh and flourishing. The Olive (*Olea*) is common on the rocks of Palestine; it may now, according to the accounts of travelers, be found upon the same spot which was called eleven centuries before the Christian era the Mount of Olives, or Mount Olivet.

169. *Order Digynia, two pistils.*—Contains the sweet-scented spring-grass (ANTHOXANTHUM *odoratum*), which is found in blossom in May; to this grass the pleasant smell of new-made hay is chiefly owing; its odor is like that of clover. This plant is separated, by the artificial system, from the other grasses on account of its having but two stamens.

a. The Catalpa, an elegant tree with flat, *cordate* or heart-shaped leaves, is indigenous to the Southern United States; its white flowers striped with purple grow in panicles similar to the Horse-chestnut. Only one species is found in North America.

170. *Order Trigynia, three pistils.*—Contains the genus PIPER, one species of which, the *nigrum*, is the common *black-pepper*. The *cayenne-pepper* belongs to the genus CAPSICUM, which is found in the eighth class. The flowers of the Piper genus have neither calyx nor corolla; the fruit is borne on a spadix. The *Piperaceæ* family, or natural order, consists of but the one genus, Piper, which contains many species. The Piper *cubeba* contains a peculiar principle in its fruit which is known in medicine as *cubeb*-pepper; another species of this genus

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a. Veronica—*b.* Nyctanthes—Olive.—169. Second order—Catalpa.—170. Order Trigynia—Pepper—First order of the third class.

furnishes from its root an intoxicating beverage, the *kava* of the South Sea Islanders; while the leaf of the Piper *betle* is chewed with the Areca-nut in the East as a stimulant.

LECTURE XXV.

TRIANDRIA, THREE STAMENS.—TETRANDRIA, FOUR STAMENS.

171. *Order Monogynia, one pistil.*—We find here among our common exotics the Crocus, one of the earliest flowers of our gardens, not unfrequently blossoming in the neighborhood of a snow-bank. It has a bulbous root, or more properly stem, long and narrow leaves, a spatha, and six petals. Besides the Crocus *vernus*, or spring crocus, which often appears even in our own climate as early as March, there is of this genus a very distinct species, the Crocus, *officinalis*, or true saffron, which appears among the late flowers of autumn. The following beautiful lines respecting these flowers are from the pen of one* whose early and fervent piety marked him as a fit inhabitant of a purer sphere;—a Christian philosopher, he could see an invisible hand directing the operations of nature.

> "Say, what *impels,* amid surrounding snow
> Congealed, the *Crocus' flamy bud* to grow?
> Say, what *retards,* amid the summer's blaze,
> The *autumnal bulb,* till pale declining days?
> The God of seasons, whose pervading power
> Controls the Sun, or sheds the fleecy shower;
> He bids each flower his quickening word obey
> Or to each lingering bloom enjoins delay."

172. The Iris, or Fleur-de-lis,† is very curious in its structure. It has no proper calyx, but a spatha; its corolla consists of six parts, alternately *reflexed;* the pistil has three petalloid stigmas. It is named from Iris, the rainbow, on account of the various colors which it reflects, varying from different shades of purple, into blue, orange, yellow, and white. We have several native species of Iris, one of which, the common blue-flag, is found in wet places. The flowers are purple, streaked with yellow; this plant is sometimes called poison-flag. The Crocus and Iris are found in the natural family *Iridaceæ.* Linnæus called the same plants *Ensatæ* (from *ensis*, a sword),

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* Henry Kirke White.
† Appendix, Plate vi. Fig. 6.

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171. Different species of Crocus.—172. Iris.

on account of the shape of their leaves, which are long, narrow, and pointed.

Fig. 130.

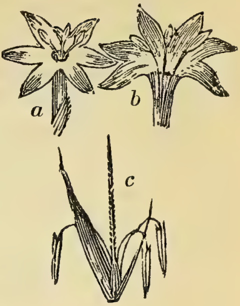

Fig. 130 represents the Ixia (blackberry lily); *a* is an entire flower; *b* the corolla cut lengthwise, showing the three stamens. At *c* is the flower of the mat-grass (*Nardus*), having but one pistil, and therefore separated from the grass family, the greater part of which we shall meet with in the next order of this class.

173. *Order Digynia, two pistils.*—We find here the natural family of the *grasses* (*Graminaceæ*); they are distinguished by a *straight, hollow*, and *jointed* stem, or *culm;* the long and linear leaves are placed at each joint of the stalk, in alternate order, inclosing it like a sheath; flowers in *spikelets* formed of an outer envelope of one or two bracts, called *glumes*, and an inner envelope (corolla) of two bracts, called *paleæ*, which constitute the *chaff* of oats, rye, &c.

a. These little flowers are best observed in a mature stage of the plant when, then bracts being expanded, *three filaments* appear, containing each a large double anther; the *two pistils* have a reflexed, feathered stigma. They have no seed-vessel; each seed is contained within the bracts, which gradually open, and unless the seed is gathered in season it falls to the ground. This facility for the distribution of the seed is one cause of the very general diffusion of grasses. The *roots* of grasses are *fibrous*, and increase in proportion as the leaves are trodden down, or consumed; and the stalks which support the flower are seldom eaten by cattle, so that the seeds are suffered to ripen. Some grasses which grow on very high mountains, where the heat is not sufficient to ripen the seed, are propagated by suckers, or shoots, which rise from the root, spread along the ground, and then take root; such grasses are called *stoloniferous.* Others are propagated in a manner not less wonderful; for the seeds begin to grow while in the flower itself, and new plants are there formed, with little leaves and roots; they then fall to the ground, where they take root. Such grasses are called *viviparous*, which signifies producing their offspring alive, either by bulbs instead of seeds, or by seeds germinating on the plant. The seeds of the grasses have but one lobe, or are not naturally divided into parts like the apple-seed and the bean; therefore these are said to be *monocotyledonous.* The *stems* of gramineous plants, like those of all the monocotyledons, are *endogenous.* With regard to the *duration* of the grass-like plants, some are *annual;* as wheat, rye, and oats, whose roots die after the grain or seed is matured. The meadow grasses are *perennial;* their herbage dying in autumn, and the roots sending out new leaves in the spring.

174. The family of grasses is one of the most natural of all the vegetable tribes: the plants which compose it seem at the first glance to be so similar that it would appear impossible to separate them into *species*, much less into *genera;* but scientific research presents us with differences sufficient to form a basis for the establishment of a great number of genera. These genera are chiefly distinguished by the *different form of the corollas and the shape of the leaves.* The *essential character* of the oat consists in the jointed, twisted awn or beard, which grows from the back of the blossom; the oat is also remarkable for its graceful *panicle.* The rye

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173. Describe the grass family—*a.* Filaments—Pistils—Roots of grasses—Manner in which grasses are propagated—Seeds—How do the stems of the grasses grow?—Duration of grass-like plants.—174. What is remarked of the separation of the grasses into genera and species?—How are the genera distinguished?

has two flowers, and the wheat three flowers within the same bracts, the interior valve of the corolla of the wheat is usually bearded. The filaments in the rye and wheat are *exsert*, from which circumstance these grains are more exposed to injury from heavy rains than plants whose filaments are shorter. In the whole of the vegetable kingdom, though there are many plants of much greater brilliancy of appearance, there are none more important to man than the grass family.

a. Linnæus, who was distinguished for the liveliness of his fancy no less than the clearness of his reasoning powers, seemed to delight in tracing analogies between plants and men: establishing among the former a kind of aristocracy, he called grasses the *plebeians* of the vegetable kingdom. To them, indeed, belong neither brilliancy of appearance nor delicacy of constitution; numerous, humble, and rustic, and at the same time giving to man and beast the sustenance necessary to preserve life, the grasses may well be compared to the unassuming farmer and mechanic, to whom society is indebted for its existence and prosperity, far more than to the idle fop or blustering politician.

175. The grasses are supposed to include nearly one-sixth part of the whole vegetable world; they cover the earth as with a green carpet, and furnish food for man and beast. Some of these, most valuable as furnishing food for cattle, are herds-grass (*Phleum pratense*); meadow-grass (*Poa*); orchard-grass (*Dactylis*); and oats. The Phleum *pratense* has a long cylindric spike or head, consisting of many minute flowers. Each valve of the calyx glume is flattened and obtuse, terminated by a very short bristle; within these two truncated valves is the corolla glume, consisting also of two awnless or simple valves. The *Alopecurus*, or *fox-tail grass*, resembles the herds-grass, but flowers earlier; it bears a soft instead of a rough spike, and a corolla glume of but one valve, bearing an awn on the back. In the *Poa*, or meadow-grass, of which there are many species, the flowers are in small heads called *spikelets*, and have a general calyx glume including from three or five to forty flower glumes which are all consequently destitute of any thing more than the two-valved general calyx, and are without any proper calyx to each flower; the flower is compressed so as to appear almost keeled, and is destitute of awns. If, with all these appearances, except a roundness and rigidity in the valves, they should gradually terminate in awns or bristles, the plant will be a *Festuca* (Fescue-grass) in place of a *Poa*. But if the plant, with the same appearance generally, should have the corolla glume blunt, and awned a very little below the point, it will then be a *Bromus* instead of a Festuca. The reed (Arundo) is distinguished by having three, five, or more woolly glumes in a common or rather long membraneous calyx. It has also broader leaves than almost any other grass, is nearly aquatic, and generally of gigantic hight in all the species. In wheat the flowers are collected into a spike of two rows, made up of spikelets or clusters, seated

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Importance of the grass family.—*a.* What did Linnæus call the grasses?—175. Which are among the most valuable grasses for cattle?—Which for the use of man?—Phleum—Alopecurus, Poa, &c.

on the indented stem, or rachis, each calyx containing three or four flowers: the central ones, for want of room to expand, are rendered infertile, the two outer ones only producing grain. The calyx glume, from the magnitude of the seed, becomes broad and boat-shaped, terminated simply by a point, or else by an awn; the larger valve of the corolla also ends in a bristle. Nearly all the wheat cultivated is of but one species, and now known to produce many permanent varieties. The plants of the grass family which are used as food for man are wheat, rye, barley, and Indian corn; the latter is separated from its natural alliances by the artificial system, and placed in the class Monœcia, because the stamens and pistils are found in different flowers growing from the same root. The styles, long, slender, and *exserted*, form what is called the *silk;* they are thus favorably situated for receiving the fertilizing pollen which is showered down from the staminate flowers.

176. The fruit of wheat, rye, &c., is called *grain.* Grain consists of the seed with its pericarp; these are not easily distinguished from each other till the grain is ground into flour; the pericarp separating from the seed then forms what is called the *bran;* and the seed, the *flour* or *meal.* The sugar-cane (SACCHARUM *officinarum**) is supposed to have been brought from the South of Europe to the West Indies. The stem or culm, which sometimes grows to the hight of twenty feet, affords the juice from which sugar is made. The bamboo (ARUNDO *bambos*) of the East Indies is a species of reed, which is said to attain in some situations the hight of sixty feet.

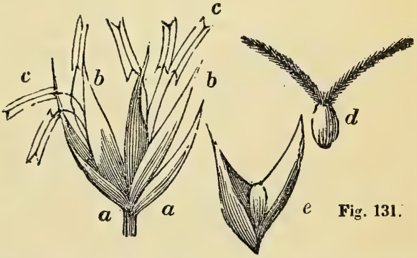

Fig. 131.

The sedge (*Carex*) is a gramineous plant, but as it bears staminate and pistillate flowers, is placed in the class Monœcia. The *carices* (plural of carex) constitute a very numerous family of plants.

Fig. 131 represents two magnified flowers of the orchard-grass (DACTYLIS *glomerata*);† at *a* is a calyx‡ composed of two valves; these are *compressed, keeled,*§ *acute;* one valve is shorter than the valves of the flowers, the other longer; the calyx is common to the two flowers; *b* shows the valves of the corollas; they are *oblong* and *acute; c* represents the stamens, which are three in each flower; the filaments are of the length of the corolla; the anthers are two-forked, or *bifid;* *d* is the pistil, having an egg-shaped ovary, and two spreading and feathery styles; at *e* is the seed, not having any proper pericarp but inclosed by the two scales of the corolla: it is single and naked.

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* See Appendix, Plate ii. Fig. 2.

† Glomerata signifies a cluster, alluding to the crowded panicles of flowers.

‡ The parts of the calyx, and also of the corolla, are sometimes called *glumes;* they are all much alike in appearance, being merely a set of sheaths, for the purpose of protecting the stamens: they are not distinguished by any difference in color from the leaves or stem. The anthers, which are usually yellow, are the only part of the flower of the grasses which is colored.

§ Resembling the keel of a boat.

What is said of Indian corn?—Grain—Sugar-cane—Bamboo—Sedge?—What does Fig. 131 represent?

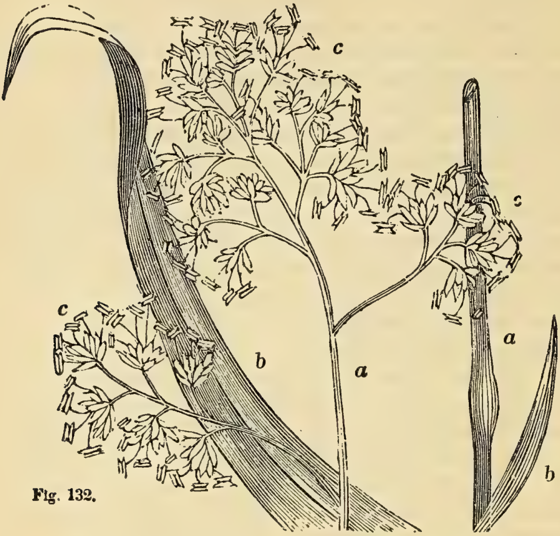

Fig. 132.

Fig. 132 shows the orchard-grass of its natural size; *a* is the stem, which is a cylindric and jointed *culm.* At *b* is the leaf, which is *long, narrow, pointed, simple,* and *entire.* At *c* are the flowers, which are *thick, panicled,* and *terminal.*

The orchard-grass is very common in the New England and Middle States.

Of all the grasses, the darnel (*Lolium*) only is poisonous; this plant seems to have been known in the days of Virgil, who in his "Pastorals" represents the shepherds speaking of the *lolium* as destructive to their flocks. The Darnel, *tare* or *lolium*, produces its flowers in a spike, almost in the manner of wheat, but the calyx consists of but a single outer valve, and contains a spikelet of many equal flowers like a Festuca. The common species here naturalized is perennial, and has beardless flowers. The delightful odor of new hay is owing to the presence of the *Anthoxanthum* odoratum. The flowers, when mature, form a yellow, chaffy spike.

CLASS TETRANDRIA, FOUR STAMENS.

177. The same number of stamens are found in plants of this class as in those of the class Didynamia, but in the former the stamens are of *equal* length. We here meet with no large

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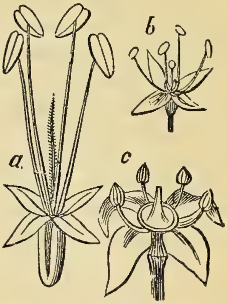
What does Fig. 132 represent?—Which of the grasses is poisonous?—177. Class Tetrandria.

natural family; the genera which compose it appearing little united by natural relations.

Fig. 133.



178. *Order Monogynia, one pistil.*—Houstonia *cærulea* is known by different common names; as *Innocence*, *Venus's Pride*, and *Blue Houstonia.* It is a very delicate little flower, appearing early in the spring, in grassy fields and meadows; the color varies from sky-blue (which gives its specific name, *cærulea*) to pure white. It has a small calyx with four sepals, and a monopetalous corolla of four deep divisions, which gives it the appearance of a cruciform plant.

The common Plantain (*Plantago*, Fig. 133, *a*) is found here. The flowers grow on a spike; they are very small, but each one has a calyx and corolla; these are four-parted; the filaments are long; the pericarp ovate, with two cells.

179. *Aggregate Flowers.*—We find in this class what Linnæus called the aggregate flowers. This term is used when many flowers are situated on the same receptacle; they have a general resemblance to the compound flowers in the class Syngenesia, but differ from them in having but four stamens, with anthers separate, while the Syngenesious plants have five united anthers. The aggregate flowers are not often yellow like many of the compound flowers, but are usually either blue, white, red, or purple. The button-bush (*Cephalanthus*) is a shrub of about five feet in hight. The inflorescence is white, appearing in large heads of a globular form, each consisting of many perfect little florets. Only one species of this genus, the *occidentalis*,* is known, and this is entirely confined to North America. The *Cornus* (from *cornu*, a horn, so called on account of the hardness of the wood) is a genus composed mostly of shrub-like plants with flowers growing in flat clusters, or *cymes*. The *florida*, a species of cornus called dog-wood, is a beautiful ornament of our woods. It is from fifteen to thirty feet in hight. Its real corollas are very small, but the head or cyme is surrounded by an *involucrum* of four large obovate leaves, usually white, but sometimes of a pale rose-color; hence its specific name *florida*, or florid. The large leaves of the involucrum might at first sight be regarded as petals. At Fig. 133, *b*, is a representation of a species of the cornus; the style is about the same length as the petals;

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* From *occidens*, the west, being found on the western continent.

178. First order—Houstonia—Plantain.—179. Aggregate flowers—Button-bush—Cornus.

these are four in number. The normal number, four, is well retained in the parts of this flower.

At *c*, Fig. 133, is the *Cissus*,[*] or false grape; its calyx is very small; petals spreading and reflexed; filaments shorter than the petals, and crowned with large cordate anthers.

180. The Bed-straw (*Galium*) is an herbaceous plant, with very small white flowers; the leaves grow in whorls. In different species, the leaves thus clustered together stand around the stem in *fours*, *fives*, *sixes*, and *eights*. Some species exhibit a peculiar roughness upon the stems and leaves. This genus was placed by Linnæus in a natural order, called *Stellatæ* (from stella, a star); the leaves radiating from the stem, as rays of light from a star. Among the exotics of this class are the SANTALUM, which produces the *sandal-wood*, and the Madder (RUBIA *tinctoria*), the root of which gives a beautiful scarlet color: it is said to have the singular property of tinging, with its red color, the bones of the animals that feed upon it. Jussieu arranged this, with the Cornus and some other Tetrandrous plants, under the natural order Rubiaceæ, which is retained by the later botanists. The Silver-tree (PROTEA *argentea*) has soft leaves resembling satin, of a silver color. Another species of *Protea*, the *aurea* or golden, has gold-colored leaves edged with scarlet. Both these trees are natives of the Cape of Good Hope, and have never been found in any other locality.

181. *Order Digynia, two pistils.*—HAMAMELIS, a shrub from six to twelve feet high, is found in woods throughout the United States. Its flowers are yellow, and grow in axillary clusters. This plant is often seen by the road-sides on the skirts of woods, and may be known from the fact of its being in blossom after it has lost its leaves, in autumn, and even in winter. The fruit is perfected in the spring: its common name, Witch-hazel, probably originated from the superstitious idea which was long entertained that a twig from this tree, called a divining-rod, in the hands of particular individuals had the property of being attracted toward gold or silver buried in the earth. Some botanists, however, ascribe the common name of this plant to its peculiarity as to the mode of blooming. By De Candolle and Lindley this genus is taken from the order Berberides, of Jussieu, and stands as the type of the order *Hamamelaceæ*.

182. *Order Tetragynia, three pistils.*—The holly (*Ilex*) is an

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[*] Mirbel thus names the plant whose flower is here described, and places it in the class Tetrandria. Eaton describes it under the name of Ampelopsis, and places it in the class Pentandria. Although it may occasionally be found with five stamens, its four petals and four divisions of the calyx seem to indicate that the fifth stamen is but an accidental circumstance; this seems to have been the opinion of Mirbel.

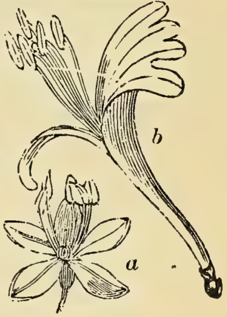
Cissus.—180. Bed-straw—What plants are placed in Linnæus's natural order Stellatæ and Jussieu' order Rubiaceæ?—Madder—Protea.—181. Hamamelis.—182. Ilex.

evergreen, with a smooth, grayish bark; shining, thorny leaves; whitish flowers; and scarlet berries: this plant is much cultivated in England for fences.

LECTURE XXVI.

PENTANDRIA, FIVE STAMENS.

Fig. 134.



183. This class is supposed to comprehend more than one-tenth part of all known species of plants. It differs from the class Syngenesia in having its *five stamens separate.* Plants with five stamens, including the Syngenesious, or those which have anthers united, are said to constitute one-fourth part of the vegetable kingdom.

184. *Order Monogynia, one pistil, Asperifoliæ, or Boraginaceæ.*—Here we find a group of plants, called by Linnæus *Asperifoliæ* (from *asper*, rough, and *folium*, leaf), or rough-leaved plants. These have monopetalous corollas, with five stamens and five naked seeds. The seeds are *dicotyledonous.* They now constitute the natural order called *Boraginaceæ*, from the genus Borago. "The change in the corolla of these plants, in general from a bright red to a vivid blue, as the flower expands, apparently caused by the sudden loss of some acid principle, is a very curious phenomenon."* The *Cynoglossum* is an interesting plant for botanical analysis. Its common name, hound's-tongue, is given from its soft, oval leaves. Although classed with rough-leaved plants, its pubescence gives to its leaves a softness appearing to the touch like velvet. This plant is about two feet high; the flowers of a reddish purple, growing in panicles.† The Lungwort (*Pulmonaria*), which also belongs to this natural family, has two species in North America with smooth leaves. The mouse-ear (*Myosotis*) is valued for its medicinal properties; a species, the *arvensis*, or Forget-me-not, is an interesting little blue flower. The gromwell (*Lithospermum*) is a rough plant with white flowers; the bark of the plant contains so much silex or flinty matter as to

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* Smith.—This subject we have elsewhere noticed.

† It is said that the leaves of this plant, if strewed about apartments infested with rats and mice, will expel these vermin.

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183. Class Pentandria—How different from the class Syngenesia?—184. Characteristics of the Asperifoliæ—Cynoglossum—Lungwort—Myosotis—What other rough-leaved plants are mentioned in the first order of the fifth class?

injure the sickles of the reapers when it grows in the field with the grain. The name, Lithospermum, is from the Greek *lithos*, a stone, and *sperma*, a seed, in allusion to the hardness of the seed. The *Borago* is an exotic with a wheel-shaped corolla of a beautiful blue color, having its throat closed with five small protuberances; stamens attached to the tube of the corolla. By taking off the corolla carefully, may be seen the little scales which choke up the throat, and the manner in which the five stamens adhere to the corolla.

185. We next meet with a family of plants named by Linnæus *Luridœ*, from their pale or lurid color. Jussieu called them the *Solaneœ*, considering the potato, *Solanum*, the type of the order. The general characters of these plants are a monopetalous corolla, of a lurid or pale appearance; five stamens attached to the base of the corolla, and alternating with its divisions; leaves alternate. The common potato (SOLANUM *tuberosum*) has conspicuous flowers; the anthers are oblong, thick, partly united at the top, and open at the summit by two pores. The potato was not known in Europe until after the discovery of America. In the year 1597 Sir Walter Raleigh, on his return from this country, distributed a few potatoes in Ireland, where they became numerous, and the cultivation of them soon extended into England. The tubers of the potato are now considered as subterranean stems, the true roots, by means of which the plant receives nourishment, being fibrous. The green balls upon the stalks of this plant are the pericarps, and contain the seed. The little knobs called eyes, which appear upon the tubers of the potato, are germs or buds, each of which is capable of producing a plant.* The Tomato and the Egg-plant belong to the genus *Solanum.* In the same natural order is the DATURA *stramonium*, a large, ill-looking, nauseous-scented weed; with a funnel-form, plaited corolla, either white or purple, with broad, dark-green leaves; and an ovate, thorny pericarp, often called Thorn-apple. It continues to blossom during the summer; is found by the sides of roads, around old buildings, and in waste grounds. Yet even this disagreeable plant has its uses; on account of its narcotic, and other active properties, it is highly valuable in medicine. In the group of plants we are now considering is the tobacco (NICOTIANA *tabacum*), a native of America, imported into Europe about the middle of the 16th century. It was presented to Catherine de Medicis, Queen of France, as

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* This is more properly a *continuation* of the plant, than a *reproduction*;—it is found that the vegetable thus continued appears, in process of time, to degenerate, and it is necessary to renew the race by reproducing it from seed.

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185. Luridæ or Solaneæ—Describe the potato—What other plants are in the genus Solanum?—Datura—Tobacco.

a plant from the New World, possessing extraordinary virtues. The generic name, Nicotiana, is derived from *Nicot*, the name of the person who carried it to France. King James I. of England had such a dislike to the fumes of this plant that he wrote a pamphlet against its use, called "A Counter-blast to Tobacco." It is highly narcotic, the excessive use of it producing sleep, like opium. The oil of tobacco, when applied to a wound, is said to be equally fatal as the poison of a viper.

a. The Mandrake (Atropa *mandragora*) was much used by the ancients as an opiate; they had many absurd notions respecting this plant; they fancied in its roots, which are very large and of a peculiar appearance, a resemblance to the human form, and believed some judgment from heaven would follow those who took them out of the ground. This superstition is not more absurd than that which exists in New England among the unenlightened, that "*sowing fennel* is sowing sorrow." The Atropa *mandragora* must be distinguished from the American mandrake or May-apple, which bears a fruit pleasant to the taste and not poisonous; its botanical name is Podophyllum; it is found in the class Polyandria. We see in this instance the importance of botanical names. The common name, *mandrake*, is given to two plants essentially different; but by the use of *scientific names* there is no danger of one being taken for the other by those who know any thing of botany.

b. In this class is the very common roadside plant the mullein, well known by its general appearance; it has a five-parted calyx, and wheel-shaped corolla with five unequal divisions. The stamens are *declined*, or turned downward, and bearded. The capsule is two-celled and many-seeded. The leaves are *oblong*, *acuminate*, and *decurrent*, or with their bases extending downward around the stem; they are downy on both sides. The flowers are arranged along their stem in a *spike*. The botanical name of the common mullein is Verbascum *thapsus;* a species smaller and more delicate than the common mullein is often found in woods; this is the moth mullein, or Verbascum *blattaria.* This genus is less active in its medicinal qualities than most others of the same family; it is said to possess anodyne properties, and to be intoxicating to fish.*

186. *Lysimachiæ or Primulaceæ.*†—The fifth class contains in its first order a natural family with wheel-form corollas. Its most important genus is the Lysimachia or Loose-strife (see Fig. 134, *a*), several species of which may be found in blossom in June and July, along the banks of little brooks and in low

* Smith.

† See Appendix, Plate vii. Fig. 9.

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a. Mandrake—What other plant has the same common name?—*b.* Describe the mullein—Different species of Verbascum.—186. Lysimachia.

meadow grounds. The Stricta, or cluster-flowered loose-strife, is from one to two feet in hight; it bears a profusion of fine yellow blossoms in a loose terminal raceme. After flowering, it throws out bulblets from the axils of the leaves, which produce new plants.

a. The *Primula*, from which the natural family Primulaceæ was named by Professor Lindley, is a beautiful genus; most of its species blossom early, whence its name, *primula*, from *primus*, first. The primula is the proper *primrose;* it received its name in England, where it is very common. The *Primula vulgaris* is the common English primrose;—the cowslip (*veris*), oxlip (*elatior*), and Scottish primrose (*scotica*), are all different species of the same genus. These are cultivated in our gardens, as also the *Primula auricula*, a native of the Swiss Alps (often improperly called polyanthos); we have but one native species of primula which is much known, the *farinosa*, bird's-eye primrose. When we read in British authors of primroses and cowslips, we must remember that they are not the same flowers which we usually call by these names. The English cowslip (*Primula veris*) has the segments of its corolla spotted with a rich, yellow color, which Shakspeare seemed to suppose contained the fragrance of the flower. Thus in the "Midsummer Night's Dream" the Fairy says:

"I serve the fairy queen,
To dew her orbs upon the green:
The *cowslips* tall, her pensioners be;
In their gold coats spots you see;
Those be rubies, fairy favors,
In those freckles live their savors;
I must go seek some dew-drops here,
And hang a pearl in every cowslip's ear."

The American Cowslip belongs to the genus *Caltha*, of the class Polyandria. The *coffee-plant* (Coffea *arabica*) is a native of Arabia; it is used to a great extent by the Turks and Arabs, to counteract the narcotic effects of opium, which they use in large quantities. It is remarked by a physician, that the question is often asked, which is the least detrimental to health, tea or coffee; he says: "The Turks, who drink great quantities of coffee, and the Chinese, who make equally as free use of tea, do not exhibit such peculiar effects as render it easy to decide whether they are in reality deleterious to the human system."

187. The *trumpet honeysuckle* (*Lonicera*, Fig. 134, *b*) has a very minute, five-cleft calyx, which is *superior*, or above the germ: the corolla is monopetalous, with an oblong tube; the *limb* of the corolla is deeply divided into five *revolute* segments, one of which seems separated from the others; the filaments are *exsert*, anthers *oblong*. The general characters of the *grape* (Vitis) are, a calyx, five-toothed; petals adhering at the top; a round five-seeded pericarp. The stamens and pistils are, in some species, *diœcious*, or on separate plants; this circumstance would carry a plant into the class Diœcia; but as some species have perfect flowers containing five stamens and one pistil, and as it is not permitted to separate the different species of a genus, we take the *diœcious* ones, which are less numerous than the pentandrous, into the fifth class.

a. The regions which produce the wine-grape have a mean annual temperature*

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* By mean annual temperature is meant a medium between the extremes of heat and cold. In a

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a. Primula—Coffee.—187. Trumpet honeysuckle—General characters of the grape genus.

of 50° on the northern border, and 59° on the southern. Lines of temperature have been fixed by Humboldt by remarking the peculiar vegetables in different latitudes. He has traced the northern limit of the wine-grape, where the mean annual temperature is about 50°, across the United States to the Pacific Ocean; not, however, in a straight line, for climate, although chiefly dependent on latitude, is yet much modified by other circumstances; and on the western coast of America we find in latitude 50° a similar climate to the 43d degree of latitude on the eastern coast. Thus, the wine-grape may grow in 50° of latitude near the lakes, the Mississippi, and Pacific Ocean; while in the eastern part of New York and New England, it would not thrive beyond the 43d degree of latitude. We find on the eastern side of the Atlantic, the region of the wine-grape, including France and the southern countries of Europe, extending as high as latitude 50°. The southern limit of the wine-grape is traced from Raleigh, in the United States, in latitude 35°, to Europe, where it passes between Rome and Florence, in latitude 44°; this line is the boundary between the grape region and that of the olive and fig, which require a warmer climate. The banks of the Rhine produce excellent grapes, which are brought down the river in great quantities to the seaports. The festival of the *Vintage*, or the gathering of the grapes, which, like our *Thanksgiving* season, is intended as a manifestation of gratitude for the fruits of the earth, was celebrated with much joy by the ancient Romans, and is still observed by the people of Italy; it occurs with them about the beginning of September; in France and the south of Germany it is later. The vines of Italy are often trained upon trees, particularly upon the lofty elm. In France the vine is supported by short saplings, about the length of bean-poles.

It is said the Persian vine-dressers conduct the vines up the walls of their vineyards, and curl them over on the other side; this they do by tying small stones to the extremity of the tendrils. This practice may illustrate a passage in Genesis: "*Joseph is a fruitful bough; even a fruitful bough by a well; whose branches run over the wall.*" "The vine, particularly in Turkey and Greece, is frequently made to intwine on trellises around a well, where, in the heat of the day, families collect and sit under their shade."

188. *The violet*, genus Viola, contains many native species The garden-violet, *Viola tri-color*, has a variety of common names, as pansy, heart's-ease, &c. Pansy is a corruption of th French *pensée*, a thought; thus Shakspeare, in the character of Ophelia, says:

> "There's rosemary—that's for *remembrance;*
> And these are pansies—
> That's for *thought.*"

Shakspeare also calls the same flower, "*Love in idleness.*" The blue violet (*Viola cærulia*) is found among the first flowers of spring. Our meadows present a great variety of beautiful and fragrant violets. The genus *Capsicum* affords the Cayenne pepper, a South American plant, and the red pepper of our gardens. The pericarps, when ripe, are of a bright red; the seeds are attached to a central column; they are heating and stimulating; valuable in decoction as an antidote to sore throat. The natural order *Convolvulaceæ* is composed of pentandrious plants; here we find the morning-glory, jalap plant—whose root-stock furnishes the medicinal part—the cypress-vine, and the sweet potato, or *convolvulus batatas;* and yet modern botanists say the natural orders bring together plants of *similar properties*

climate where the thermometer in summer would rise to 100 degrees, and in winter sink to zero, or 0, the medium would be 50 degrees: this is probably not far from the mean annual temperature of our climate. The mean annual temperature at the equator is reckoned to be about 84 degrees.

Temperature of the regions which produce the wine-grape—Mean annual temperature (*see note*)—*a.* What is the natural limit of the wine-grape?—How does the climate of the western coast of America correspond to that of the eastern coast?—Crossing the Atlantic, where do we find the northern and southern limits of the wine-grape?—Vintage—Wines—Vineyards.—188. Violet—Capsicum.—Convolvulaceæ.

We are no more able to trace the analogies which exist between the common potato, the deadly night-shade, and tobacco, than the affinities between the nauseous jalap and the sweet potato of the same *natural* order.

189. *Order Digynia, two pistils.*—We find here the *Gentian*, which affords some plants with delicate flowers, and others valuable for medicinal properties. The fringed gentian is a beautiful wild plant with a blue flower. The GENTIANA *lutea*, which affords the medicinal gentian, is found on the Alps, at a high elevation; it produces yellow flowers, and has a yellow root. This genus sometimes presents an irregularity in the number of stamens. The lobes of the calyx and corolla are of the same number, and alternating with them; the stamens vary in number from four to five, the latter number being most common. The large inflated corollas of the *saponaria*, or soap-wort gentian, appear like buds. In the natural family, called *Atriplices*, from the genus *Atriplex* (sea-orache), is the pig-weed, or goose-foot, *Chenopodium*. It is grouped by natural characters with the beet and spinach, whose flowers are destitute of beauty. According to the late arrangement of natural orders, we find these plants in the order *Chenopodiaceæ*, in which are the pig-weed, water-hemp, and several other plants, placed by Jussieu in his order *Atriplices*.

190. *Umbelliferous Plants.*—We meet in this order of the class Pentandria with the *Umbelliferæ*, a large family, closely allied in natural characters.* Among the plants of this family which are used for food are the carrot, parsnip, celery, and parsley; the aromatics are dill, fennel, caraway, coriander, and sweet cicely. Poison hemlock (*Conium*), water-parsnip (*Sium*), water cow-bane, are among the poisonous plants of this tribe.

The water cow-bane (CICUTA *virosa*) grows in ponds and marshes. Cows are often killed in the spring by eating it, but as the summer advances, the smell becomes stronger and they carefully avoid it. Linnæus relates, that in a tour made into Lapland, for scientific purposes, he was told of a disease among the cattle of Torneo, which killed a great many in the spring, when they first began to feed in pastures. The inhabitants were unable to account for this circumstance; but the Swedish botanist examining the pastures, discovered a marsh where the CICUTA *virosa* grew in abundance; he acquainted the people with the poisonous qualities of the plant, and thus enabled them to provide against the danger by fencing in the marsh. The poison hemlock (CONIUM *maculatum*) has a peculiarly unpleasant, nauseous smell; its stalk is large and spotted, from whence its specific name *maculatum*. This plant is supposed to be the poison so fatally administered by the Athenians to Socrates and Phocion. The umbellate plants which grow on dry ground are aromatic; as dill and fennel: those which grow in wet places are among the most deadly poisons; as water-parsnip, &c. Plants of this family are not in general so beautiful to the sight, nor so interesting as objects of botanical analysis, as many others.† Fig. 135 represents the coriander (coriandrum).

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* See Plate ii. Fig. 3, for a plant of this family.

† "Botanists in general shrink from the study of the Umbelliferæ; nor have these plants much beauty in the eyes of amateurs; but they will repay the trouble of a careful observation. The late M. Cusso

189. Gentianæ—Family Atriplices—Chenopodiæ.—190. Umbelliferæ

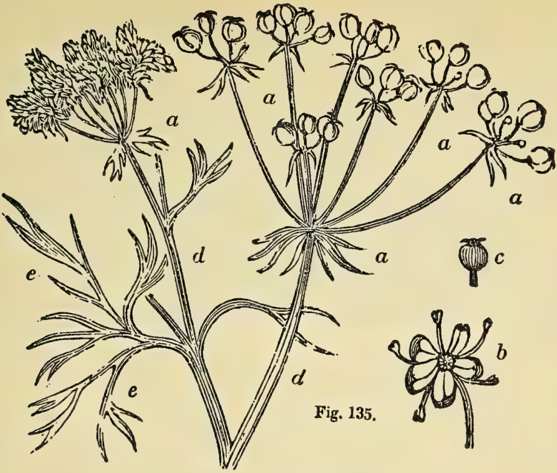

Fig. 135.

1. Calyx, *a*, an *involucrum;* the leaves at the foot of the *universal umbel* form the *general involucrum ;* the leaves at the foot of the *partial umbel* form a *partial involucrum.* The involucrums are *pinnatifid.*
2. Corolla, *b*, represented as magnified; it has five petals, *inflexed*, or bent inward.
3. Stamens five, anthers somewhat divided.
4. Pistils two, *reflexed*, as seen on the seed *c*, where the stigmas are permanent.
5. Pericarp, is wanting in all umbellate plants.
6. Seed, *c*, is round, with its two styles at the summit; it consists of two carpels, separating from each other by their faces (commissure) into halves.
7. Stem, *d*, hollow, furrowed, herbaceous, branched, pinnatifid, compound, and sheathing.
8. Leaves, *e*, narrow, pinnatifid.
9. Flowers, terminal, umbelled.*

In distinguishing the genera of umbelliferous plants, the *figure*, *position*, *albumen*. *margin*, and *angles* of the seeds are much regarded. The seeds of the carrot are *bristly*, of the poison hemlock *ribbed*, of the parsnip *flat*. The Umbelliferæ are a united family; we meet with no *disunionists* having stamens more or less than the normal number.

191. *Order Trigynia, three pistils.*—The elder (*Sambucus*) is a small shrub which ornaments the fields during summer with its clusters of delicate white flowers. From the appearance of the blossom it might be regarded as umbelliferous; the stalks radiate from one common center, but are unequally *subdivided;* this arrangement of flowers is called a *cyme*. The dark, rich purple berries of the elder, and the peculiarity of its pithy

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of Montpelier bestowed more pains upon them than any other botanist has ever done; but the world has, as yet, been favored with only a part of his remarks. His labors met with a most ungrateful check, in the unkindness and mortifying stupidity of his wife, who, in his absence from home, is recorded to have destroyed his whole herbarium, scraping off the dried specimens for the sake of the paper on which they were pasted!"—*Smith's Introduction to Botany.*

* The description of this plant is given on the authority of Nuttall, who calls it the American coriander, which he found in the neighborhood of the Red River. The cultivated coriander has a one-leafed involucrum.

Describe Fig. 135—Circumstances noted in describing umbelliferous plants.—191. Elder.

stem, are among its distinguishing natural characters. The snow-ball, *Viburnum*, has a natural affinity with the elder (both are of the natural order *Caprifoliaceæ*); the flowers in the *cymes* of the viburnum are more thickly clustered together: both are distinguished by their flat corollas which resemble a circular piece of paper with five divisions notched on the border. The generic differences between these plants are, that the snow-ball has a berry with *one* seed, and leaves *simple;* the elder has a berry with *three* seeds, leaves *pinnate.* The snow-ball which is cultivated in shrubberies is an exotic; there is a native species of Viburnum, the *oxycoccus*, which produces showy flowers early in the spring, and is well worth a place in pleasure-grounds.

192. *Order Tetragynia, four pistils.*—Here we find the grass of Parnassus (*Parnassia*); the leaves are white, and beautifully veined with yellow; the stem produces but one flower; the five nectariferous glands are remarkable for their beauty and singular appearance. The plant is said to be a native of Mount Parnassus, in Greece; it is placed in the natural order *Hypericaceæ*, the general character of which is, dark glands upon the edges of the petals, long styles, and apocarpous fruit. The fringed glands of the Parnassia are considered as representing abortive stamens, and thus furnishing an alliance with polyandrous plants.

193. *Order Pentagynia, five pistils.*—The flax, *Linum*, so called from a Celtic word, *lin*, a thread, has a showy blue flower, with an erect stem. A field of flax in blossom presents a beautiful appearance. The cultivated species is said to be of Egyptian origin. It is from the liber or inner bark of the stem of this plant that all linen goods, and the finest lawn and cambric are manufactured.

We owe to the flax plant, in one sense, our literature; as the paper of which our books are made is mostly from linen rags. The fibers of the stem are not only thus important to the comfort of man by contributing to his clothing, and to his intellectual improvement in furnishing a method of disseminating knowledge, but the seeds are highly valuable for their oil, called *linseed* oil: this is used in medicine. The delightful performances of the painter are executed by means of colors prepared with oil from the seed of the flax, laid upon the canvas made from the fibers of its stems. The Linum is the type and only important genus of the natural order *Linaceæ*, or flax-worts. The tenacity of their fiber, and the mucilage of their seeds, are striking characters of this natural order.

194. *Order Polygynia, many pistils.*—Here we find the yellow-root (*Zanthoriza*), a native of the Southern States. It has five stamens, thirteen pistils, no calyx, five petals, five nectariferous organs, and five capsules; the flowers are purple, growing in panicles. It is a low shrub, with a yellow root, some-

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Snow-ball.—192. Grass of Parnassus- -Hypericaceæ.—193 Flax—Lineaceæ.—194. Zanthoriza.

times used by dyers; the wood and bark of some of its species are a tonic bitter. This genus is placed in the natural order *Ranunculaceæ.*

b. Our explanation of the class Pentandria has necessarily been somewhat tedious, on account of the number and importance of the plants which it contains, few of which, in comparison with the whole, we have been able to notice. We do not, however, expect to make practical botanists by introducing to the student a few interesting plants;—this can only be done by gathering flowers and examining them according to those rules of analysis which we have endeavored to explain in the most simple manner. Those who *study* flowers will read descriptive botany with pleasure and profit—otherwise, to little advantage. Sciences may be unfolded, every facility which books and teaching can give may be placed before the youthful mind, but that *mind* must itself be active, or the germs of knowledge will no more take root and expand than the seeds of plants would vegetate if thrown upon the bare surface of a granite rock.

LECTURE XXVII.

HEXANDRIA, SIX STAMENS.—HEPTANDRIA, SEVEN STAMENS.

195. *Hexandria.*—Of all the Artificial classes none presents us with so great a number of splendid genera as this; most of them are distinguished by bulbous roots, *monocotyledonous seeds*, and *endogenous stems;* the palms and some other plants of this class have *fibrous roots* in connection with the last two characters which are inseparable; the *structure of the stem* or the manner of its growth *depends on the structure of the seed.*

196. *Order Monogynia, one pistil.*—The natural order Liliaceæ comprehends not only the lily, but the tulip, crown-imperial, hyacinth, and many other of our most beautiful exotics, as well as many native plants. The liliaceous flowers have no calyx; the perianth, colored and petal-like, is usually called the corolla. The number of stamens is generally six, sometimes but three; in the latter case the plant is in the class Triandria: the stamens are opposite the divisions of the corolla; anthers introrse; germ triangular, three-celled, superior; leaves parallel-veined. The fibrous roots connected with bulbs, tubers, or rhizomes, are now ranked as subterranean stems.

a. Pliny says the "lily is next in nobility to the rose."* Linnæus called the liliaceous flowers "*Nobles* of the vegetable kingdom;" he also called the palm-

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* "*Lilium nobilitate proximum est.*" A French poet, in the following lines, gives the lily a rank above the rose.

> "Noble fils du soleil, le *lys majesteux.*
> Vers l'astre paternal dont il brave les feux
> Elève avec orgueil sa tête souveraine;
> Il est *roi* des fleurs, la *rose est la reine.*"

Ranunculaceæ—Remarks.—195. Class Hexandria—Natural characters which distinguish plants of this class.—196. Liliaceæ—Lily—Proportion as to numbers.

trees "*Princes* of India," and the grasses *Plebeians.* In our republican country, where aristocratic distinctions among men are discarded, orders of nobility among plants should not exist; the humblest in appearance are often found most valuable.

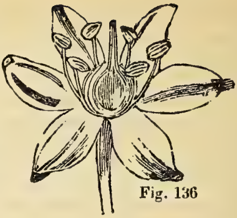
Fig. 136

The lily has six stamens; six petals, three exterior, three interior; capsule three-sided, with three cells and three valves; the seeds are arranged in six rows.

a. This proportion as to numbers seems to forbid the idea that this plant was produced without the agency of a designing mind. We are not always, however, to expect the same symmetry in plants as has been here remarked. It is in the natural, as in the moral world, that, although we see around us such proofs of order and system, as manifest the superintending care of one Almighty Being, yet we meet with irregularities which we cannot comprehend; but, although we may admire the *order,* we are not to say that even what seems *disorder* is formed without a plan.

> "Shall little haughty ignorance pronounce
> His works unwise, of which the smallest part
> Exceeds the narrow visions of his mind?"

b. The *Tulip* has no style, but its three-parted stigma is attached to a three cornered ovary. The corolla of the tulip is more expanded at the base than that of the lily. The scape of the tulip is never more than one-flowered, while the stem of the lily usually has a number of flowers. In no plant is the variation made by culture greater than in the tulip; it is said, that of one single species (Tulipa *gesneriana*), eleven hundred varieties are cultivated in Holland. About the middle of the seventeenth century the rage for tulips (*tulip mania*) was so great that some were sold for four thousand dollars, and one variety, called the Viceroi, for ten thousand dollars; but this extraordinary traffic was checked by a law, that no tulip or other flower should be sold for a sum exceeding one hundred and seventy-five dollars.

c. The *Crown-imperial** is a majestic flower, and presents in the regularity of its parts and curious appearance of its nectariferous glands facts of great interest both in the departments of botanical classification and physiology. But we find in the fetid odor of this splendid flower, a circumstance which leads us to prefer as an ornament for our parlors or as a gift to a friend, the humble mignonette or the lowly violet.

d. This simple fact might suggest to the young, that in order to be desirable to others, they must be agreeable; the mere circumstance of a fine person cannot long render tolerable the society of one who possesses neither useful nor amiable qualities.

197. The lily family is divided into several tribes, as the *Tulipaceæ*, which are *bulbous plants*, the *perianth scarcely adhering to form a tube*, the *integuments of the seed soft*, as in the tulip, lily, and crown-imperial; the *Hemerocallidæ*, in which the petals are united in a tube, as the day-lily and tube-rose; be-

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* This plant is represented at Plate vii., Fig. 4, of the Appendix; the Yucca *aloifolia*, which belongs to the same natural family, is represented at Plate ii., Fig. 1. The Narcissus is represented at Plate vii., Fig. 7. The Agave, of the Narcissi family, is represented at Plate vii., Fig. 2. The Pineapple, belonging to this class and order, is represented at Plate v., Fig. 3.

sides, there are the Scilleæ tribe, with smaller flowers, and seeds black, as in the onion and hyacinth; the *Convallariceæ*, or Solomon's-seal tribe, containing the lily of the valley; and the asparagus, the type of the tribe *Asparageæ.*

198. The *Palms* of the natural order *Palmaceæ*, have mostly a liliaceous corolla with six stamens; some are *monœcious*, others *diœcious;* while a part have their stamens and pistils within the same corolla, and belong to the artificial class Hexandria.

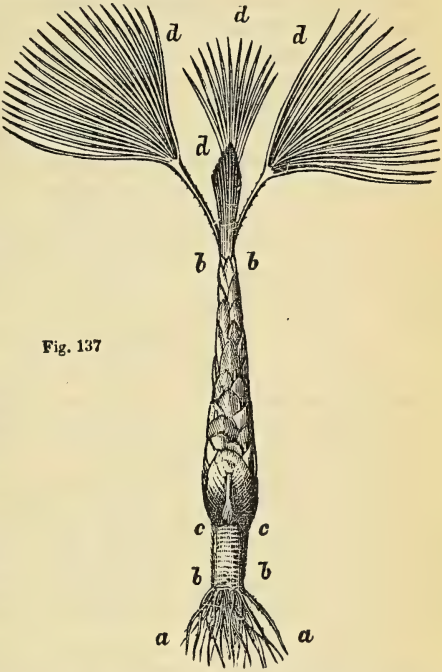

Fig. 137

Fig. 137 represents a young palm-tree (*Chamærops humilis*);* at *a* is the fibrous root; *b c*, the oldest part of the stipe, showing, by the lines and dots, the place of insertion of the first leaves; *c b*, the upper part of the stipe, still covered with the sheathing bases of the petioles; *d*, the crowning, terminal leaves—these are petioled, fan-shaped, and plaited when young; the petioles are armed with prickles. Palms live to a great age; they are the product of tropical regions, and afford the date, cocoanut, and other valuable fruit.

199. *Miscellaneous Examples of Plants in the Sixth Class and First Order.*—The Spiderwort (*Tradescantia*) has six stamens, three petals, three sepals; (the whole may be termed a perianth in two verticils;) capsule three-celled; leaves *ensiform.* It remains in blossom nearly the whole summer, and is well worth cultivation, both for its cheerful appearance and normal botanical characters. The Spiderworts exhibit the first remove from sedge-like plants to the true lilies; that is, the *glumaceous* structure is gone, and the *liliaceous* peculiarity gained. Though we find, in company with so many elegant flowers, the onion and bulrush, we must recollect that the title to admission into this artificial class and order is six stamens and one pistil;

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* Although we have described this plant under the class Hexandria, in conformity with the classification of some writers, it is questionable whether it does not rather belong to Diœcia. In the Appendix, at Plate i., Fig. 1, is a representation of the *Areca*, which belongs to the Palm tribe; and at Plate iii., Fig. 3, is a representation of the same palm-tree as seen at Fig. 137.

198. Palms—Describe Fig. 137.—199. Spiderworts.

and no plant, however humble, with these characteristics, is excluded from a place beside the proud tulip and the noble lily. The Asphodel, a native of Sicily, was, among the ancients, a funereal plant; it was made to grow around the tombs, a belief prevailing that the *manes* of the departed were nourished by its roots. An inscription upon a very ancient tomb commences thus: "*I am nourished by the Asphodel.*" This plant was supposed, by the ancient poets, to grow in abundance upon the borders of the infernal regions. Fig. 136 represents a flower of the Eucomis, which, with the asphodel, is now placed in the tribe *Scilleæ*, of the great order *Liliaceæ.* The genus *Scilla* is an exotic, containing the squill, a medicinal plant, and the harebell of English poets, Scilla *nutans*, or nodding; it abounds in the woods and glens of Scotland, and has a very slender scape. Thus Scott, in the "Lady of the Lake," says of Ellen Douglas:

> "E'en the slight harebell raised its head,
> Elastic from her airy tread."

The flower which we call harebell is the *Campanula rotundifolia*, of a different artificial and natural order. The barberry (*Berberis*) is common in New England; its stamens possess an unusual degree of irritability; they recline upon the petals, but when the bases of the filaments are touched by any substance, they instantly spring toward the pistil.

a. Although we have remarked upon the *beauty* of flowers in this class, nothing has been said of their *utility;* the truth is, that good looks, as is too often the case with external beauty, constitutes their chief merit: when we compare the advantages which the world derives from the costly race of showy tulips, with the utility of the humble flax, we feel that though we may admire the one, reason would teach us to prefer the other. Let the young student from this derive a moral lesson, which shall suggest to the mind some truths applicable to human beings as well as plants.

b. The genus *Convallaria* contains the lily of the valley, and many other delicate and interesting species. The name Solomon's-seal is supposed to have been taken from certain marks on its roots resembling the impressions made by a seal. It was formerly much celebrated for its medicinal properties.*

200. *Order Digynia, two pistils.*—The *Rice* (*Oryza*) belongs to the family of grasses, most genera of which we find in the class Triandria; but this plant having six stamens, is separated by the artificial system from the tribe to which it is allied by natural characters. No plant appears of more general utility as an article of food than rice. It is the prevailing grain of Asia, Africa, the southern parts of America, and is exported into every part of North America and Europe.

201. *Order Trigynia, three pistils.*—The genus *Rumex* contains the dock and common sorrel, the flowers of which have

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* Gerard, a very ancient botanist, has the following curious passage: "The root of Solomon's-seal stamped, while it is fresh and greene, and applied, taketh away in one night, or two at the most, any bruse, black or blew spots, gotten by fals, or woman's wilfulness, in stumbling upon their hasty husband's fists, or such like."

Asphodel—Scilla—Harebell—Barberry—*a.* Reflections—*b.* Convallaria.—200. Rice.—201. Rumex.

no proper corolla; the six stamens and three pistils are surrounded by six sepals, united at the base; the stipules are of that peculiar kind called ochrea, or boot-like, forming sheaths around the stem above the bases of the leaves. The *Colchicum* autumnale is allied by many natural characters to the Crocus and Iris. The bulb is a subterranean egg-shaped stem, with the flower, like the Crocus, half hidden in the earth; the bulb possesses powerful medicinal qualities. In spring several narrow leaves arise, but the flower does not appear till September; the phyton lies buried in the root all winter, and is raised in spring to perfect its seeds before the next season. The flowers are pale purple: this plant is a native of England.

CLASS VII.—HEPTANDRIA, SEVEN STAMENS.

202. *Order Monogynia, one pistil.*—A fine specimen of this class and order is the chick-wintergreen (*Trientalis*); the calyx has seven sepals, the corolla is seven-parted. One species is said to defend its stamens against injury from rain, by closing its petals and hanging down its head in wet weather. There is sometimes to be found in this genus a variation in the number of stamens; in which case the other parts of the flower also vary. This genus belongs to the great natural order, *Primulaceæ.* The cultivated Horse-chestnut *Æsculus* (Fig. 138) is a native of the northern part of Asia, and was introduced into Europe about the year 1500; it was not probably brought to America until some time after the settlement of this country by Europeans. It is a small tree which produces white flowers, variegated with red, crowded together in the form of a panicle; the whole resembling a pyramid. The blossom is very irregular in its parts; that is, its other divisions do not correspond with the usual number of stamens; the stamens, however, do not vary as to number. The seeds have a resemblance to chestnuts, but their taste is bitter. There are several native species of this plant in the Southern and Western States. The horse-chestnut exhibits in its buds the woolly envelope which surrounds the young flowers, the scales which inclose this envelope, and the varnish covering the whole. The stems and branches afford good subjects for studying the formation and growth of woody, or exogenous stems. The Horse-chestnut is the type of the natural order *Hippocastaneæ.*

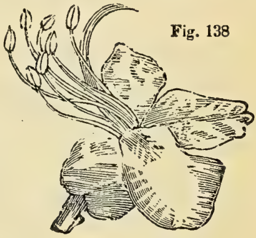

Fig. 138

203. *Order Tetragynia, four pistils.*—There is but one plant

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Colchicum.—202. What plant is in the first order of the seventh class?—Horse-chestnut.

with four pistils known in the class Heptandria; its common name is lizard's-tail (*Saururus*). It has arrow-shaped leaves, flowers destitute of a corolla, and growing upon a spike; it is to be found in stagnant waters. It gives name to the natural order *Saururaceæ;* the flowers of which are *achlamydeous*, or without perianth. The number of stamens sometimes varies.

204. *Order Heptagynia, seven pistils.*—The Septas, a native of the Cape of Good Hope, is considered as the most perfect plant in this class, though its natural affinities are obscure; it has seven stamens, seven pistils, seven petals, a calyx seven-parted, and seven ovaries (one to each pistil), which become seven capsules, or seed-vessels.

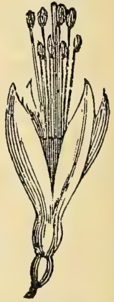
205. Heptandria is the smallest of all the classes; we do not find here, as in most of the artificial classes, any natural families of plants; but the few genera which it contains differ not only in natural characters from other plants, but they seem to have no general points of resemblance among themselves.

LECTURE XXVIII.

OCTANDRIA, EIGHT STAMENS.—ENNEANDRIA, NINE STAMENS.

206. The eighth class, although not large, contains some beautiful and useful plants. In the order Monogynia is the *Œnothera*, or *evening primrose*, many species of which are common to our country; some grow to the hight of five feet. The flowers are generally of a pale yellow, and in some species they remain closed during the greater part of the day, and open as the sun is near setting.

Fig. 139.



a. This process of their opening is very curious; the calyx suddenly springs out and turns itself back quite to the stem, and the petals being thus released from the confinement in which they had been held, immediately expand. There are few flowers which thus hail the *setting* sun, though many salute it at its *rising*. The flowers of the Œnothera are thickly clustered on a spike, and it is said that "each one, after expanding once, fades, and never again blossoms." This flower has been observed in dark nights to throw out a light resembling that of phosphorus. The regularity of its parts renders it a good example of the eighth class, the different parts of its corolla preserve in their divisions the number four, or half the number of stamens. It has four large yellow petals; the stigma is four-cleft; capsule four-celled, four-valved; the seeds are affixed to a four-sided receptacle.

207. The Œnothera belongs to the natural order *Onagra-*

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203. Saururus.—204. Order Heptagynia.—205. Remarks upon the class Heptandria.—206. Eighth class—Evening primrose—*a.* Process of opening, &c.—207. Natural order, Onagraceæ.

ceæ,* the characters of which are, four petals *above* the calyx, stamens inserted in the same manner and equal or double the number of petals; the fruit a capsule or berry. To the same artificial class and order, as well as to the same natural order, belongs the willow-herb (*Epilobium*), a branching plant, with red flowers and feathery seeds. The cranberry (*Oxycoccus*) also belongs to the same natural family, but having ten stamens, is placed in the class Decandria. The fruit of the cranberry consists of large scarlet berries which contain tartaric acid; flowers white, with a four-toothed calyx, and corolla four-parted. It is found in swamps in various parts of North America. The ladies' ear-drop, *Fuschsia* (Fig. 139), is a beautiful exotic of the same artificial class and natural family. It has a funnel-form calyx, in some species of a brilliant red color; the petals almost concealed by the calyx are purple and rolled round the stamens which are long, extending themselves beyond the colored calyx. This plant is a native of Mexico and South America, except one species, from the island of New Zealand. Some of the species of this genus bear edible fruits; the wood of some is employed in Brazil in dyeing.

208. The heath (*Erica*) is not known to be indigenous to this country; many species have been introduced. The common heath (*Erica cinerea*) has bell-form flowers, small and delicate, with the color pink, or varying into other colors; the flowers intermixed with the delicate green leaves produce a fine effect. The kind of soil necessary to the growth of the heath is the peat earth so common in England and Scotland, in which countries this plant abounds; thus Scott says of his "Lady of the Lake,"

"A foot more light, a step more true,
Ne'er from the heath-flower brushed the dew."

In the Highlands of Scotland the poor make use of the heath to thatch the roofs of their cottages; their beds are also made of it. The field in which this plant grows is termed a heath or heather.

"The Erica here,
That o'er the Caledonian hills sublime
Spreads its dark mantle, where the bees delight
To seek their purest honey, flourishes;
Sometimes with bells like amethysts, and then
Paler and shaded, like the maiden's cheek,
With gradual blushes; other while as white
As frost that hangs upon the wintry spray."

The Erica is the type of a large natural order, the *Ericaceæ*; which includes the Arbutus, the edible wintergreen, Gaultheria; and the bitter wintergreen, Pyrola.

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* The common French name for the evening primrose is *Onagré*.

209. The Daphne is a rare plant; one species is called the lace-bark tree, from the resemblance of its inner bark, or *liber*, to lace; it consists of layers which may be drawn out into a fine white web, three or four feet wide; Charles I. of England was presented by the governor of Jamaica with a cravat made of this web. The plant is a native of the West Indies. The Nasturtion (*Tropæolum*) is a very commonly cultivated exotic. The divisions are not four or eight, as we might expect from its eight stamens, but the calyx is either four or five-parted, and the corolla is five-petaled. In some cases the number of stamens has been known to vary, and abortive petals appear. The fruit consists of three seeds; when green they are used for pickles. "The generic name (*Tropæolum*) signifies a *trophy-plant;* this alludes to its use for decorating triumphal arches, or to the resemblance of its peltate leaves to shields, as well as its flowers to golden helmets pierced through and stained with blood."* It was first observed by the daughter of Linnæus, that these flowers sometimes emit electrical light.

210. *Order Digynia*, *two pistils.*—Containing the *Chrysosplenium*, of the natural order *Saxifragaceæ.* The ovary consists of two carpels; number of stamens sometimes variable, petals wanting.

211. *Order Trigynia.*—Contains the Buckwheat (*Polygonum*). The genus is extensive, containing many common weeds, as knot-grass, bind-weed, &c. The *fagopyrum* is the true buckwheat; the meal obtained by grinding its seed is much esteemed for griddle-cakes. The Polygonum is variable in its number of stamens; the seed is a triangular nut. This genus is the type of the natural order *Polygonaceæ*, having flowers with no corollas, and a calyx usually colored; including the dock and sorrel plants.

212. *Order Tetragynia.*—We here find the beautiful plant, Paris, said to have been named after a prince of ancient Troy, remarkable for his beauty. In every part of the flower the numbers four and eight prevail in the divisions. It has eight stamens, four pistils, four petals, four sepals, a four-sided and four-celled pericarp, which contains eight seeds, and in one species four large spreading leaves, at a little distance below the flower. The color of the whole plant is green. Properties narcotic. Native of England. This genus belongs to the natural order *Trilliaceæ*, distinguished for beautiful and regular flowers. The Trillium is as remarkable for its divisions by *threes*, as is the Paris for *fours*.

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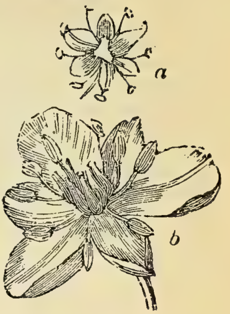
* Sir J. E. Smith.

209 Lace-bark tree—Nasturtion.—210. Second order.—211 Third order.—212. Fourth order.

CLASS IX.—ENNEANDRIA, NINE STAMENS.

Fig. 140.



213. In the *Order Monogynia* we find the genus *Laurus*, which includes the cinnamon, bay, sassafras, camphor, spice-bush, &c., all of the natural order *Lauraceæ;* the stamens are usually arranged in two rows; the three of the inner row being often sterile and extrorse, while the six in the outer row are fertile and introrse.

a. The bay (*Laurus nobilis*) is a native of Italy; the Romans considered it a favorite of the Muses, and the Emperor Tiberius wore it, not only as a triumphal crown, but as a protection against thunder, it being thought that Jupiter had a particular regard for it The laurel, as well as the olive, was considered as an emblem of peace; it was sometimes called laurus *pacifera*, the peace-bearing laurel. Branches of laurel carried among contending armies, were considered as a signal for the cessation of arms. The victors in the Olympic games were crowned with wreaths of laurel. Poets crowned with it were called *laureates.* Camphor is the produce of the Laurus *camphora*, a large tree which grows in Japan. The Laurus *cinnamomum* grows to the hight of thirty feet; it sends out numerous branches crowned with a smooth bark. The leaves are bright green, standing in opposite pairs. The petals are six, of a greenish-white color. The fruit is a pulpy pericarp inclosing a nut. This tree is a native of Ceylon, where it grows very common in woods and hedges. The imported cinnamon is the inner bark (*liber*) of the tree; it is remarkable that the leaves, fruit, and root, all yield oil of very different qualities. That produced from the leaves is called the *oil of cloves;* that obtained from the fruit is of a thick consistence, very fragrant, and is made into candles for the use of the king; the bark of the roots affords an aromatic oil, called the *oil of camphor.* The Sassafras-tree (Laurus *sassafras*) is a native American plant; when first introduced into Europe it sold for a great price, the oil being highly valued for medicinal uses. It grows on the borders of streams and in woods; it is often no larger than a shrub; its flowers are yellow; its fruit, blue berries. The Laurus *benzoin*, called spice-bush, has scarlet berries, and is an aromatic plant.

Fig. 140, *a*,* represents a flower of the Butomas (*flowering rush*); petals six, ovate. The *umbellatus* is the only species known in England; the flowers are in rose-colored umbels. It is found in wet grounds, and near the margin of lakes and ponds. In the north of Europe are found many species; they are aquatic, umbellate plants. The Butomas is the type of a natural order *Butomaceæ*, not generally admitted.

214. *Order Trigynia* presents us with but one genus, the Rhubarb (*Rheum*). The acid leaves of the Rheum *tartaricum* are used for pies. This plant is a native of Tartary; it is now common in our gardens. The R. *palmatum* produces the

* See also Appendix, Plate viii., Fig. 4.

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213. Class Enneandria—Different species of the genus Laurus—Lauraceæ—*a.* Describe the different species of Laurus—Butomas.—214. Order Trigynia.

medicinal rhubarb; this is obtained from the roots, which are thick, fleshy, and yellow. In this root are *raphides* of oxalate of lime, which yield a large proportion of rhubarb. At Fig. 140, *b*, is a flower of the genus *Rheum*.

a. In becoming interested in the study of plants, we naturally wish to know something about those which we are in the habit of using for food or medicine, or to which, as in the laurel of the ancients, allusions are often made in the books we read. But no one can become a practical botanist without much observation of native plants. They must be sought in their own homes, in the clefts of rocks, by the side of brooks, and in the shady woods; it is there we find nature in her unvitiated simplicity. We do not go to the crowded city to find men exhibiting, undisguisedly, the feelings of the heart; and the flower transplanted from its rural abodes, often exhibits in the green-house a metamorphosis which conceals its real character.

LECTURE XXIX.

DECANDRIA, TEN STAMENS.

215. The number of stamens in plants of this class must not only be ten, but these must be distinct from each other; that is, neither united by their filaments nor by their anthers. Other classes may also have ten stamens; but circumstances respecting the *situation* of these organs distinguish these classes from each other.

216. *Order Monogynia, one pistil.*—We here find some plants with *papilionaceous corollas;* these, because their *filaments are not united*, are separated from the natural family to which they belong, and which are mostly in the artificial class Diadelphia. The wild indigo (*Baptisia*) has ten stamens, distinct; yellow, papilionaceous flowers, and leguminous fruit. This plant becomes black in drying. The Cassia *fistula*, a native of the Indies, contains in its legume a pulp secreted from the endocarp which is much valued in medicine, and known by the name of cassia. The Cassia *senna* furnishes the *senna* used in medicine; this species grows in Egypt and Arabia. Cassia *marylandica* is called American *senna* on account of its medicinal qualities. Cassia *nictitans* has small yellow flowers and beautiful pinnate leaves; it is called the American sensitive-plant, as it closes its leaves when touched, and folds them at night. A plant, called, by the Indians, red-bud (Cercis *canadensis*), belongs to this class, and to the great natural family, *Leguminosæ*. It is a large tree, appearing early in spring, laden with clusters of fine crimson flowers, resembling at a

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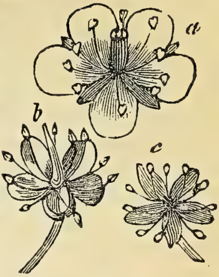
a. Remarks.—215. Is there any class except the tenth in which the flowers have ten stamens?—216 Order Monogynia—Wild Indigo—Cassia—Cercis.

distance a peach-tree in blossom, except that the color of the flowers is less delicate. The leaves, which are large and cordate, do not appear as early as the blossoms. The beautiful aspect of the tree attracts insects. A botanist* says, "I have often observed hundreds of the common humble-bees lying dead under these trees while in flower." This is not the only example of fatal consequences which result from trusting too much to external appearances! This tree is not improperly called Judas' tree.

Fig. 141.



a. The rue (*Ruta*) is an exotic, which gives name to one of Jussieu's natural orders called *Rutaceæ;* these plants have a monosepalous calyx; five petals, alternating with the lobes of the calyx; the germ is large and superior. (See Fig. 141, *a.*)

b. At *b*, Fig. 141, is a representation of the flower of the Saxifraga, one species of which is called *beefsteak-geranium;* its leaves are roundish and hairy; it sends forth creeping shoots. The *Saxifracaceæ* natural order contains many genera.

217. This class and order presents us with the *Wintergreen* tribe, which are classed among the heath-like plants (*Ericaceæ*, see ¶ 208); they are shrubby, with monopetalous, bell-form corollas, and evergreen leaves. In shady woods, where the soil is loose and rich, we find, in June and July, the spicy wintergreen (*Gaultheria*), a perennial plant which grows to the hight of eight or ten inches; the pleasant taste of the leaves and fruit of this plant is well known to the children of this country; the drooping blossom is very delicate and beautiful, consisting of a bell-form corolla (not unlike the lily of the valley), the color of which is tinged with pink. Those who have enjoyed eating the fruit and leaves of the wintergreen may experience a delight which the pleasure of sense cannot afford, when, in their botanical rambles in the woods, they may chance to meet with this plant in blossom, with its little flowers just peeping out from a bed of dry leaves; the pleasure of viewing a beautiful object may then be united with the intellectual gratification of tracing those characters which give it a definite place in scientific arrangement. Among the wintergreen tribe are two genera, Pyrola and Chimaphila, which by some botanists have been included under one; but they appear to be sufficiently distinct from each other to constitute a separate genus. These plants were classed by Linnæus in the natural order *Bicornes*, or two horns, alluding to the two protuberances like straight horns which appear on their anthers.

218. A great proportion of the plants in the first order of

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* W. P. C. Barton.

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a. **Natural order Rutaceæ—*b*. Saxifraga.—217 Wintergreen tribe.—218. Monotropa, or Indian-pipe**

the tenth class are to be found in shady woods in June and July. We will mention another of the heath tribe, the Monotropa, a most curious little plant;—several stems of a few inches in hight form a cluster; each stem supports a single flower, resembling a tobacco-pipe. The stems are scaly, but without leaves; the whole plant is perfectly white, and looks as if made of wax; it is sometimes called Indian-pipe. This may be sought for in shady woods, near the roots of old trees, in June or July. Rhododendron, an evergreen with large and beautiful oval leaves, is found growing on the sides of mountains, or in wet swamps of cedar; it flourishes beneath the shade of trees; the pink and white flowers appear in large showy clusters, and continue in bloom for a long period; they have a five-toothed calyx; a five-cleft, funnel-form, somewhat irregular corolla; stamens ten, sometimes half the number, capsule five-celled, five-valved. At Fig. 141, *c*, is a flower of the genus *Ledum* (Labrador tea); it has a very small calyx, and a flat, five-parted corolla; is found on the White Mountains of New Hampshire. Connected by natural relations to the *Rhododendreæ* is a splendid shrub, the American laurel (*Kalmia*). On the Alleghany Mountains it may be seen twenty feet in hight; the flowers grow in a *corymb;* they are either white or red. This fair and beautiful shrub is of a poisonous nature, particularly fatal to sheep who are attracted toward it; one species of the Kalmia is on this account called *sheep-laurel.*

219. The Dionæa *muscipula*,* or Venus' fly-trap, is a native of North Carolina; the leaves spring from the roots; each leaf has, at its extremity, a kind of appendage like a small leaf doubled; this is bordered on its edges by glands resembling hairs, and containing a liquid that attracts insects; but no sooner does the unfortunate insect alight upon the leaf, than with a sudden spring it closes, and the little prisoner is crushed to death in the midst of the sweets it had imprudently attempted to seize; after the insect, overcome by the closeness of the grasp, has expired, the leaf again unfolds itself.

220. *Order Digynia, two pistils*, contains the *Hydrangea*, an elegant East Indian exotic; a species of this plant, a shrub with white flowers, is said to have been found on the banks of the Schuylkill River. The Pink tribe, of the natural order *Caryophyllaceæ*, is composed of plants belonging to this class, some of which have *three* styles, or sessile stigmas, others have *five*, but the greater part have *two*.

a. The genus *Dianthus*, containing the pinks and sweet-william, is a great favorite with florists, who gravely tell us what varieties we ought most to admire; as if fashion, and not nature, were to regulate our emotions. A writer on the culture of flowers observes, that a florist may consider himself fortunate if, in the course of his life, he should be able to raise *six* superior carnations;—but the hope that such success may crown his labors he thinks a sufficient stimulus to continued exertions. To degrade the beautiful and innocent employment of cultivating plants by rivalries to produce a flower that may claim to be *distingué*, shows that the serpent still lingers in Eden. Let the flower-garden be a retreat from low and groveling competitions, the promoter of innocence, of benevolence to man, and devotion to God.

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* See Appendix, Plate iii., Fig. 6.

221. *Order Trigynia, three pistils.*—We here find the genus SILENE, one species of which is called the catch-fly; another, the *nocturna*, or night-blooming, is,

> "That *Silene* who declines
> The garish noontide's blazing light;
> But when the evening crescent shines,
> Gives all her sweetness to the night."

Another genus, the sandwort, is the

> "*Arenaria*, who creeps
> Among the loose and liquid sands."

222. *Order Pentagynia, five pistils.*—The corn-cockle (*Agrostemma*) is very common in corn or wheat fields; although troublesome, it is a handsome pink-like plant, with showy corollas; it resembles the genus Dianthus, but has five pistils instead of two, on which account it is placed in the fifth artificial order, but is found in the same natural order. The wood-sorrel, *oxalis*, produces the *oxalic acid*, which in a concentrated state is poisonous. This is the type of a natural order called *Oxalidaceæ*, the characters of which are, Geraniæ (or geranium-like), *exogens*, with *symmetrical flowers*, *distinct styles*, *carpels longer than the torus*, and seeds with abundant albumen.

223. *Order Decagynia, ten pistils.*—In this order is the Poke-weed (*Phytolacca*), a very common plant, found on the borders of fields and road-sides; the fruit consists of large dark berries, filled with a reddish-purple juice. The flower has ten stamens, ten styles, a calyx with five white petaloid sepals, berry superior, with ten cells, and ten seeds. When there is a variation in the number of stamens, other parts of the flower usually exhibit a similar change as to number of parts.

LECTURE XXX.

ICOSANDRIA, OVER TEN STAMENS, INSERTED ON THE CALYX;—POLYANDRIA, MANY STAMENS.

224. HAD we strictly followed the classification of Linnæus, we should have met with the class Dodecandria, from *dodeka*,

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221. Plants in the order Trigynia.—222. Order Pentagynia.—223. Poke-weed.—224. What is said of the class which is omitted in this part of the system?

twelve, and *andria*, stamen; this was not, as might be inferred from the name, confined to twelve stamens, but contained from ten to twenty, without any regard to their insertion. This class produced much confusion in our science; for it is found that plants having more than ten stamens, frequently vary as to their *number;*—there being no difficulty in distributing all plants of this class in the two next classes, the plants which it contained are arranged under Icosandria, if the stamens are on the *calyx*, and Polyandria, if the stamens are inserted upon the *receptacle*. The *manner of insertion is always the same* in the same genus, and therefore there can be no confusion with respect to determining the classes upon this principle.

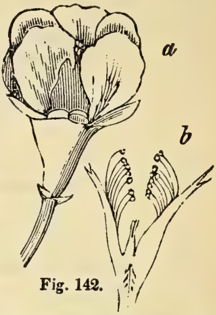

Fig. 142.

This omission of one class changes the numbers of the re maining classes; as Icosandria, which was formerly the twelfth, is now the eleventh class; and so on with the other classes. On account of these changes, it is better to learn the classes by their appropriate names, as Monandria, Diandria. Moreover, the name of each class conveys an idea of its character.

a. The name Icosandria, from *eikosi*, twenty, and *andria*, stamens, seems not, however, exactly well chosen to represent the eleventh class, which is not confined to twenty stamens, having sometimes as few as ten, and in some cases nearly a hundred stamens. Darlington proposed to call the class *Calycandria*, from calyx and *andria*, as the insertion of the stamens on the calyx is the essential circumstance on which the class depends; but though this change has been approved, the former name is still used. Thus, with respect to the name of the great American continent, all allow it should be Columbia, after its discoverer; but it is difficult to overthrow the authority of custom.

225. *Order Monogynia, one pistil.*—We meet here with the *Prickly-Pear tribe*, in which the Cactus is the most important genus. The natural family of which this is the type is called *Cactaceæ*, or the Indian-fig tribe. The sepals are numerous and confounded with the petals adherent to the ovary. Stamens indefinite, cohering more or less with the petals and sepals. These plants are succulent shrubs, with angular or flattened stems; they are remarkable for their development of cellular tissue with spiral cells.

a. Among the most splendid of the Cactus species is the night-blooming Cereus (Cactus *grandiflorus*), having flowers nearly a foot in diameter, with the calyx yellow, and the petals white. The blossoms begin to expand soon after the setting of the sun, and close before its rising, never again to open. Another species (*speciossissimus*), with flowers like crimson velvet, is still more superb than the *grandiflorus*. The different species of this genus are distinguished by a diversity of common

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Why is it important to learn the appropriate names of the classes, rather than their numbers?—*a.* What name has been proposed as a substitute for Icosandria?—225. Cactus.—*a.* Different species of Cactus.

names; when they are of a *round* form, they are called *Melon-thistles;* when more cylindrical and erect, *Torch-thistles;* when creeping, with lateral flowers, *Cereuses;* and when composed of a stem resembling flattened leaves, *Prickly-pears.* Plants of the Cactus tribe are mostly destitute of leaves, but the angular or flattened stems often appear like a series of thick, fleshy leaves, one growing from the top of another. The beautiful dye called *cochineal* is obtained from an insect of this name, which feeds upon the *Cactus cochinillifer.* The Cactus opuntia, or true prickly pear, is found native in the United States.* In Brazil, some of the Cactus family have been known to attain the hight of thirty feet, with a circumference of three feet.

226. The family *Amygdalæ* comprehends the peach and almond, of the genus Amygdalus, with the plum, cherry, and pomegranate. These, which were placed by Jussieu in his order Rosaceæ, or rose-like plants, seem very properly separated. The characteristics of this tribe are a calyx five-toothed, petals five; stamens about twenty, situated on the calyx; ovary superior, one-celled. The fruit a drupe. Trees or shrubs. The leaves and kernel contain prussic or *hydrocyanic acid.* The genus Prunus contains the various kinds of the plum, cherry, and sloe; according to ancient writers it was brought from Syria into Greece, and from thence into Italy. We have several native species. The pomegranate (PUNICA) is a shrubby tree, a native of Spain, Italy, and Barbary; it flowers from June till September. The Greek writers were acquainted with it, and we are told by Pliny that its fruit was sold in the neighborhood of Carthage. It is cultivated in England and the United States; not for its fruit, which does not come to perfection so far north, but on account of its large and beautiful scarlet flowers, which render it an ornamental plant. At Fig. 142, *a*, is the flower of the pomegranate (*Punica granatum*); *b* represents the stamens of the same, as adhering to the calyx. The almond is a native of warm countries and seems to have been known from the remotest antiquity.

227. *Order Dipentagynia.*—Signifies *two* and *five* pistils. We find here the Pomaceæ (from *pomum*, apple), or apple tribe. This is included in Jussieu's Rosaceæ, or rose-like plants; but although the flowers of the apple genus have a strong resemblance to that of the rose, the difference in the fruit seems to render this division proper. In this tribe, the most important genus is Pyrus, which contains the apple and pear. The *varieties* of these fruits are the effects of cultivation, not the produce of different species. By means of grafting, or inoculation, good fruit may be produced upon a tree which before produced a poorer kind. Jussieu divided his natural order Rosaceæ into the following sections: *Pomaceæ*, with fruit fleshy, like the apple and pear; *Rosæ*, having urn-form calyces; *Amygdalæ*, having drupe-like fruits.

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* For illustrations of this family, see Plate i., Figures 2, 5, and 7.

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226. Family Amygdalæ—Prunus—Pomegranate—Amygdalus.—227. Order Dipentagynia—Pomaceæ- Varieties by grafting—Order Rosaceæ divided into sections.

228. *Order Polygynia, many pistils.*—The rose tribe resembles the apple tribe in the appearance of the blossom, but the fruit, instead of being a Pome, consists either of nuts containing one-seeded *achænia*, as the rose; or of berries, as the strawberry. The leaves have two stipules at their base. The rose, unchanged by cultivation has but five petals. We have few indigenous species of this genus; among these are the small wild-rose, the sweet-brier, and swamp-rose.

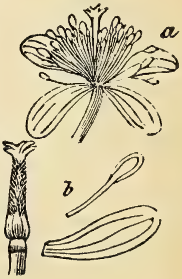
a. Red and *white* roses are remarkable in English history as emblems of the houses of *York* and *Lancaster;* when those families contended for the crown in the reign of Henry the Sixth, the white rose distinguished the partisans of the house of York, and the red those of Lancaster. Among the nations of the East, particularly in Persia, the rose flourishes in great beauty and is highly valued. The Persians poetically imagine a peculiar sympathy between the rose and the nightingale. The Blackberry (*Rubus*) has a flower resembling in general aspect the rose, there are several species of the Rubus, one which produces the common blackberry, another the red raspberry, another the black raspberry, and another the dewberry. One species, the *odoratus*, produces large and beautiful red flowers, the fruit of which is dry and not edible. The Strawberry belongs to the same natural and artificial order as the Rose. The gathering of strawberries in the fields is among the rural enjoyments of children. The fruit of the strawberry is not properly a berry, but a collection of seeds, or achænia, imbedded in a fleshy receptacle. Icosandria furnishes us with a variety of fine fruits. A great proportion of the genera to be found in this class are natives of the United States.

CLASS XII.—POLYANDRIA, MANY STAMENS.

229. In this class we find the stamens separate from the calyx, and attached to the receptacle or top of the flower-stem, called also the *thalamus* and the *torus.* The number of stamens varies from twenty to some hundreds. This class does not contain many delicious fruits, but abounds in poisonous and active vegetables. Few plants with the stamens on the calyx are poisonous; but many with the stamens upon the receptacle are so.

230. *Order Monogynia, one pistil.*—We find here the May-apple (*Podophyllum*), very common in moist, shady places, where great numbers may be seen growing together; each stem supports a large white flower, and two large, peltate, palmate leaves; its yellow fruit is eaten by many as a delicacy; the root is medicinal. The Side-saddle flower (*Sarracenia*) is a curious plant; distinguished by radical leaves with a hollow urn-shaped petiole, at whose apex is articulated the lamina, fitting on like a lid. This cup appears to be a secreting organ; it is called an *ascidium* (from *askidion*, a small sack). Such a leaf is said to be *calyptro-morphous* (from

Fig. 143.



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228. Difference between the rose and apple tribe—*a.* Rose.—Blackberry—Strawberry &c.—229. Class Polyandria.—230. Podophyllum—Sarracenia.

kaluptra, a covering, and *morphe*, form). The cup is capable of containing a gill or more of water, with which liquid it is usually filled. The scape grows to the hight of one or two feet, bearing a single, large, purple flower. This plant is found in swamps; its common name, Side-saddle flower, is given in reference to the form of its leaf; it is sometimes called Adam's cup. No foreign plant, as an object of curiosity, can exceed this native of our own swamps; it is well worth the trouble of cultivation by those who are fond of collecting rare plants.* A natural order, *Sarraceniaceæ*, which has this plant for its type, is considered as allied by Sarracenia to the crow-foot tribe, and by Heliamphora, a South American genus, to the poppy tribe.

231. The white Pond-lily (*Nymphæa*)† is a splendid American plant; the flowers are large, showy, and fragrant. The gradual change within from greenish sepals to white petals, and the petaloid filaments showing the gradual progress of stamens to petals, render this plant a good illustration of the transformation of these organs. The thickened rhizoma extends in muddy soil to a great length, giving off leaves and flowers which appear as if floating on the surface of the water of ponds and lakes. The yellow Pond-lily (*Nuphar*), though less showy, is equally curious in its structure, and belongs to the same natural family, *Nymphæaceæ*, in which is placed the new plant, *Victoria regina*, found in South America; it is one of the largest aquatic plants known; the flowers are a foot in diameter, and the leaves from four to six feet. In the class Polyandria is the Tea-tree (THEA); of this plant there are two species, the bohea tea (*bohea*), and the green tea (*viridis*). It is a small evergreen tree or shrub, much branched, and covered with a rough, dark-colored bark; it is a native of China and Japan. On account of the jealous policy of the Chinese, the natural history of the Tea-plant is little known. Tea was introduced into Europe by the Dutch East India Company, in the year 1666; for many years its great price limited its use to the most wealthy. The Camellia Japonica, and some other favorites of florists, are placed in the Natural family with the Tea plants. The numerous stamens of the poppy (*Papaver*) stand upon the receptacle around the base of the ovary; its large stigma, with the two caducous sepals, are conspicuous characters. Single poppies have but four petals; but the change of stamens to petals is very common in this flower. From the *papaver somniferum* is obtained the opium of com-

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* See Plate iii., Fig. 5.

† An extensive locality of this plant exists upon the Saratoga Lake: its surface for a quarter of a mile may be seen whitened by these lilies, occasionally intermixed with the yellow lilies, and the rich blue of the Pontederia, another beautiful aquatic plant.

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231. Pond lilies—Victoria regina—Tea-tree—Poppy—Opium.

merce. The juice which issues from incisions in the green capsules is dried in the sun, and made into cakes. The narcotic property of opium renders it highly valuable as a medicine.

232. The genus *Citrus* contains the orange, lemon, lime, citron, shaddock, &c. Oil abounds in the leaves and rind of the fruit. The lemon, lime, and citron are distinguished from the orange by their oblong form, their adherent rind, and a protuberance at the apex. The *oil of bergamot* is obtained from the rind of a small fruit of this genus. The Citrus is subject to an abnormal separation of the carpels, which produces what are called *horned* oranges, and *fingered* citrons, and in some cases to a multiplication of the normal number of carpels, in which case an orange is formed within an orange. Jussieu placed this in his order *Aurantia*, or golden fruits, now called *Aurantiaceæ.* The fruit is a berry with a thick coat; it furnishes *citric acid.*

233. *Order Dipentagynia.*—The four orders following Mono gynia are, as in the preceding class, united into one, called, as before, Dipentagynia, having from two to five styles. We find here some plants of a poisonous nature, as the larkspur, monk's-hood, and the columbine; these belong to the natural order *Ranunculaceæ*, the type of which is the ranunculus or crow-foot. The pæony (*Pæonia*), a large and showy flower, which in its simple state has five sepals, five petals, two or three ovaries, each crowned by a stigma; carpels the same in number as the ovaries, each containing several seeds: this flower is remarkable for becoming double by cultivation.

234. *Order Polygynia.*—The Clematis virginiana is a common American plant; the stem supports itself on shrubs and trees by means of its long petioles, which serve as tendrils. At Fig. 143, *a*, is a flower of the Clematis; *b* represents its receptacle with numerous styles proceeding from it, and the petals and stamens separated from their insertion upon the receptacle. The Hellebore (*Helleborus*) is an exotic much spoken of by classical writers. Hippocrates, one of the most ancient physicians, remarked upon its qualities; it grew about Mount Olympus, and was early known as a very poisonous plant. The Magnolia and Tulip-tree are among the most splendid trees of North America. In some cases these trees rise to the hight of ninety feet before sending off any considerable branches; the spreading top is then clothed with deep-green, oblong-oval leaves; they have large and fragrant white flowers. The class Polyandria contains many valuable medicinal plants, but few important fruits.

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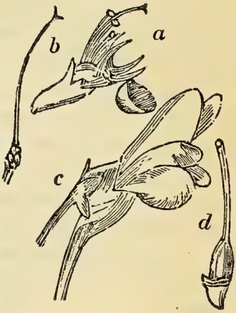
232. Genus Citrus.—233. Order Dipentagynia—Natural order Ranunculaceæ—Pæony.—234 Order Polygynia—Clematis—Hellebore—Magnolia.

LECTURE XXXI.

DIDYNAMIA.—TETRADYNAMIA.

235. These two classes are founded upon the *number* and *relative length* of the stamens. In distinguishing their orders, the *number of styles* is not regarded, but new circumstances of distinction are introduced, viz., the *seeds being inclosed in a pericarp*, or *destitute of this covering*, and *the comparative length of pods*.

Fig. 144.



CLASS XIII.—DIDYNAMIA, TWO PAIRS OF STAMENS.

236. This class has flowers with four stamens, arranged in pairs; the outer pair being longer, the inner pair shorter and converging. It contains two orders, *Gymnospermia* (seeds naked or without a pericarp), and *Angiospermia* (seeds inclosed in a pericarp). The great natural family of the *Labiatea* are mostly to be found here; the flowers are monopetalous and irregular in their outline, *labiate*, or *bilabiate*, as the two-lipped corollas are sometimes called. Labiate flowers are divided into *ringent*, gaping, and *personate*, masked or closed. These terms have been used in an indefinite manner. Linnæus called the whole tribe *ringent;* these he subdivided into labiate and personate. This division is illogical, since the *specific* term *labiate*, having lips, has a more general signification than the *generic* term *ringent*, lips gaping.

a. A few of the labiate flowers having but two stamens, are placed in the class Diandria, as the sage and mountain mint. Yet they have, besides their two perfect stamens, the rudiments of two others, as if nature had designed them for didynamous plants. Linnæus remarks, that the insects most fond of frequenting these plants have but *two perfect wings;* while the rudiments of two other wings may be found concealed under a little membrane:—"How wonderful," he says, "are the sympathies of nature!" When we examine a labiate flower, as balm or catmint, we perceive that the arched upper lip of the petals covers the stamens, and the lower lip hangs down, so that we can see the inside of the corolla; by drawing out the corolla, we find the stamens attached to it, as they usually are to monopetalous corollas; the corolla shows an aperture at the base which had contained the pistil.

b. The labiate plants inhabit hills and plains exposed to the sun. They are destitute of any deleterious secretions. The *aroma* which escapes from their flowers denotes their stimulating medicinal properties. Their action upon the animal economy differs according to the quantity of *essential oil* and of *bitter principle* which they contain; when the former prevails, as in mint, they are aromatic and

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235. Classes Didynamia and Tetradynamia.—236. Orders of the class Didynamia—Labiate plants how divided?—*a.* Are all labiate flowers in the class Didynamia?—*b.* Properties of these plants.

stimulating; when the bitter principle is in excess, as in germander, they act as tonics and strengthen the digestive organs.

The pericarp of the labiate flowers belongs to Mirbel's class of fruits, called *cenobion.*

237. *Order Gymnospermia.*—Plants in this order have *labiate* corollas of the ringent kind; seeds *four*, lying uncovered in the calyx; flowers grow in *whorls;* stem four-angled; leaves opposite. The calyx is either five-parted, or the upper part consists of two lip-like divisions.

At Fig. 144 is a flower of the genus Teucrium (*germander*)*;* the corolla is ringent, as at *a*, the upper lip two-cleft, the lower lip three-cleft; the stamens and pistils are *introrse;* the stamens are *exsert* through the cleavage on the upper side: *b* shows the pistil with its four uncovered, or gymnospermous seeds.

The Ringent flowers generally grow in whorls at the upper part of an angular stem, the leaves standing opposite. Among them we find many aromatic plants, peppermint, lavender, savory, marjorum, thyme, &c.; also many medicinal herbs, as pennyroyal, catmint, horehound, &c.; the scull-cap (*Scutellaria*), which has been said to be a remedy for the hydrophobia; the modest *Isanthus* (blue gentian), and a little flower of a beautiful blue color, called blue curls (*Trichostema*).

238. *Order Angiospermia* contains plants with many seeds in a capsule; they appear to have an affinity with some families of the class Pentandria. Many of them, in addition to the *four stamens*, have a *fifth filament*, the rudiment of another stamen; sometimes the irregular corolla varies into a regular form, with *five divisions.* Among plants which exhibit the imperfect fifth stamen, are the trumpet-flower and fox-glove. In this order the *personate* corollas are to be found, or labiate flowers with closed lips. Fig. 144, *c*, represents a flower of this kind; at *d* is the pistil showing a capsule, or that the seeds are *angiospermous.* A few flowers may be found here with bell-form, and funnel-form corollas. Plants of this order differ much in their natural characters from those of the order *Gymnospermia.* None of them are used in preparations for food, as are the thyme and savory of the first order, but many of them possess powerful medicinal properties, as the fox-glove,* and the cancer-root (*Epiphegus*). They are a beautiful collection of plants; few flowers are more splendid than the fox-glove and trumpet-flower. The Martynia is an exotic of easy cultivation, bearing a fine blossom; its pericarp furnishes an excellent pickle. Plants of this class are numerous in every part of the

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* See Plate vii., Fig. 6.

Gymnospermia—Describe Fig. 144—Ringent flowers.– 238. How is the order Angiospermia distinguished?—Personate flowers.

United States, and the student can meet with no difficulty in procuring them for analysis.

CLASS XIV.—TETRADYNAMIA, FOUR STAMENS.

239. We here find the *cruciform* plants, or such as have four petals in the form of a cross; the stamens are *six*, four of which are longer than the remaining two. In the natural order *Cruciferæ* the flowers have four sepals and four petals, each exhibiting the form of a cross; hence the term cruciform, from *crux*, a cross. The petals alternate with the sepals; this alternate position is always seen where the number of petals equals the number of sepals. The ovary becomes a *long pod*, called a *silique*, or a *short thick* one, called *silicula:* this *difference in the length of the pods* constitutes the distinction of the two orders of the class Tetradynamia, in which they are placed. The cabbage, mustard, radish, and stock-gilly-flower belong to this family. The cruciform tribe is found, on a chemical analysis, to contain some sulphur, and more nitrogen than any other family of plants.

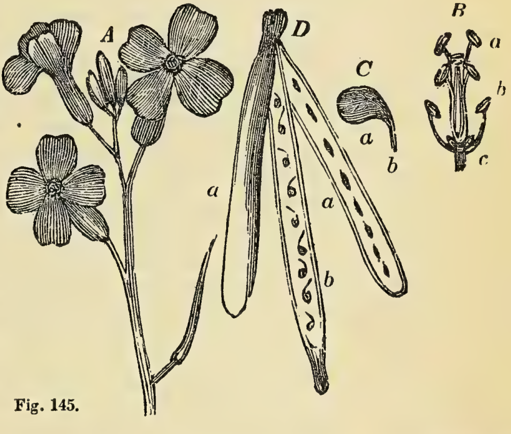

Fig. 145.

a. A flower of the cruciform tribe is represented at A, Fig. 145; at B are *six* stamens arranged in *two sets*, the four at *a* being longer than the two at *b;* at *c* are two *glands* between the short stamens and the ovary:—At C is a petal consisting of *a*, the border, and *b*, the claw; at D is the pod, which is a *silique; a* represents the valves; *b*, the seeds, alternately fastened to the edges of the partition (*dissepiment*), which divides this kind of pericarp into two cells. The cruciform plants have *dicotyledonous* seeds and *polypetalous* corollas; the stamens are *hypogynous.* They are herbs, with leaves alternate. The flowers are usually yellow or white, seldom purple. Plants of the class Tetradynamia are never poisonous; they furnish many important vegetables for the table. The part of the Cauliflower used for food is the deformed or metamorphosed flower-stalks. The distinction in the two orders, depending on the comparative length of pods, is less definite than that which marks the orders of the class Didynamia.

240. The *first Order*, *Siliculosa*, contains plants which produce a *short* and *round pod*, called a *silicula;* a distinction in this order is made between such plants as have pods with a

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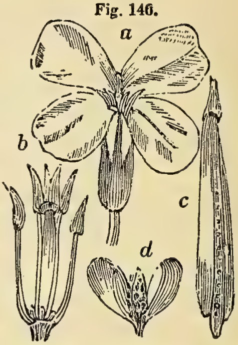
239 Class Tetradynamia—Cruciform plants—*a.* Describe Fig. 145.—240. Order Siliculosa.

notch at the top, and such as are *entire.* The Pepper-grass (*Lepidium*) and the shepherd's-purse (*Thlaspi*) afford examples of this order. At Fig. 146, *d*, is a representation of the silicula or pod of the Thlaspi. The plants found here belong to the natural family *Siliquosæ*, the properties of which are nutritious and medicinal.

Fig. 146.



241. The *second Order*, *Siliquosæ*, contains cruciform plants with *long* and *narrow siliques;* as the radish and mustard. The cabbage (*Brassica*) is an exotic; the turnip is a species of the same genus. Fig. 146, *a*, represents the wall-flower (*Cheiranthus*); the calyx consists of four oblong sepals; the petals are obovate, spreading with claws as long as the calyx. At *b* appear the six stamens divested of the petals; the ovary is cylindrical, as long as the stamens; *c* shows the silique or pod; the valves are concave, and a thin membraneous partition divides the silique into two parts. In this order there appears a want of symmetry in the number of stamens compared with the floral envelopes. The two pairs of long stamens may, however, each be considered as one *divided* stamen (a *dedoublement*), which would reduce the number to four. This view is confirmed by the fact that the two shorter stamens have teeth on each side, while the longer ones are toothed but on one side. The floral type of Cruciferæ is regarded as *quaternary; four sepals*, *four petals*, receptacle *four staminiferous glands*, *four stamens*, and *four carpels*, two of which are abortive. In some species of Iberis (candy-tuft) the floral organs have been seen to exhibit in all their parts this *quaternary*, or normal arrangement.

LECTURE XXXII.

MONADELPHIA, ONE BROTHERHOOD.

242. We are now to examine the *brotherhoods;* Monadelphia meaning one, and Diadelphia two brotherhoods, in allusion to the manner in which the filaments are connected in *one* or *two sets.* The *orders* in these classes *depend upon the number of stamens.*

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241. Order Siliquosæ—Want of symmetry explained.—242. The brotherhoods

243. In the class Monadelphia we include all such plants as have their filaments united in one set, forming a tube at the bottom of the corolla; in this respect this class differs from the preceding ones, where the stamens are entirely separate; here you will observe that the *anthers* are separate, though the *filaments* are joined. We cannot in this class, as in the two preceding ones, point out any prevailing form of the corolla. The mark of distinction here is in some cases rather doubtful, the filaments being sometimes broad at their base, and yet not entirely connected. We have no first order, for the character of the class is *filaments united*, and one filament could not form a brotherhood.

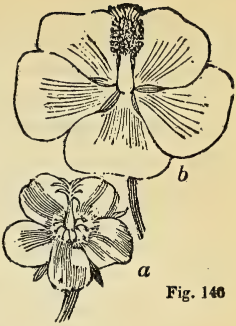

Fig. 140

244. *Order Triandria, three stamens.*—We find here blue-eyed grass (*Sisyrinchium*); the three filaments have the appearance of being but one; the corolla is tubular and six-cleft, style one, capsule three-celled; it belongs to the natural order *Iridaceæ;* similar in artificial and natural characters is a splendid plant, the Mexican tiger-flower (*Tigridia*), so called from its spotted flowers.

245. *Order Pentandria, five stamens*, presents us with the passion-flower (*Passiflora*), a climbing plant peculiar to the warm countries of America. "Its long and often woody branches attain the summits of the loftiest trees, or trail upon the ground, adorned with perennially-green, or falling leaves. They sustain themselves by means of tendrils, and send out a succession of the most curious and splendid flowers." Some species produce fruits much esteemed in the West Indies. Sixty species have been collected in one conservatory near New York. The generic characters of the passion-flower are five sepals, combined below into a tube; petals five, often with filamentous or annular processes on their inside, which appear to be an altered whorl or whorls of stamens. The name, Passion-flower, was given by the superstitious of former days, who saw in the five anthers a resemblance to the wounds of the Saviour; in the triple style, the three nails in the cross; in the central receptacle, the pillar of the cross; and in the filamentous processes, the crown of thorns around the head of Christ. This plant, by some botanists, has been placed in the class Gynandria, on the supposition that its stamens stood upon the pistil; others would place it in the class Pentandria, order

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243. Monadelphia—No first order.—244. Order Triandria.—245. Passion-flower—Derivation of its name.

Trigynia. But its place in this part of the Linnæan system seems clearly indicated; it is the type of a natural order, *Passifloraceæ*, which contains few genera. In this artificial order is the Stork's-bill geranium (*Erodium*); it is an exotic, and belongs to the natural order *Geraniaceæ.*

246. *Order Heptandria, seven stamens,* contains the genus *Pelargonium* which includes the greater number of green-house Geraniums; it is taken from the tenth order and placed here, because, though its flowers have ten filaments, only seven of them bear anthers, or are perfect. The flower is somewhat irregular. Among the varieties of the Pelargonium now cultivated in the United States are the following:

Fairy-queen geranium, striped flowers, large and handsome leaves: *Fiery-flowered,* cordate leaves, black and scarlet flowers: *Balm-scented,* leaves deeply five-lobed; flowers dark red, and black: *Grandiflorum,* erect stem, little branched; smooth leaves, from five to seven-lobed; flowers large: *Large-bracted,* erect stem, leaves cordate; flowers large, white, with some streaks of purple: *Frequent-flowering,* or *fish,* a shrubby, brown stem, with flat, cordate, five-lobed leaves; red flowers, with spots of black and deep red: *Peppermint-scented,* or *Velvet-leaved,* a shrubby stem, much branched; leaves cordate, five-lobed, soft to the touch like velvet; flowers small, white, and purple: *Nutmeg-scented,* or *fragrant,* erect stem, much branched; leaves small, cordate, and three-lobed; flowers small and pale, tinged with blue: *Royal purple,* stem branched; flat cordate leaves, five-lobed; flowers large, and of a bright purple. The plants of the natural family Geraniaceæ are mostly natives of the Cape of Good Hope, a region to which we are indebted for many of our finest exotics.

247. *Order Decandria, ten stamens,* contains the genus *Geranium,* which differs from the Pelargonium in having a regular calyx and corolla, and also in producing ten perfect stamens, which vary in length, every alternate one being longer; five glands adhere to the base of the five long filaments. We have few native species of this plant; the common Crane's-bill (GERANIUM *maculatum*), with large, showy, purple flowers, is found in meadows during the first summer months. The three genera, Erodium, Pelargonium, and Geranium, were formerly all united; but the difference in the number of stamens separates them, not only in respect to genera, but also in the artificial orders.

248. *Order Polyandria, many stamens.*—This order is made up of a group of genera which compose the natural order COLUMNIFERÆ of Linnæus; the stamens are united in the form of a *column* (Fig. 147); by Jussieu they were collected into an order under the name of *Malvaceæ* (or the mallow family), so called from the genus *Malva.* The peculiar characteristics of the group are, calyx often *double; five regular petals; stamens indefinite, united by their filaments into a tube* which rises like a column in the middle of the flower; in the center of this tube are the styles forming an inner bundle. The carpels contain one seed each and are equal in number to the

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Stork's-bill geranium.—246. Pelargonium.—247. Order Decandria.—248. Order Polyandria—Malvaceæ—Camelia.

styles; the ovary is formed by the union of the carpels round a common axis. Among the plants which compose this family, are the hollyhock, mallows, and cotton (*Gossypium*). The CAMELIA *japonica* is in this artificial class and order.

a. The plants of the class Monodelphia vary in size, from the low mallows to some of the largest trees that have yet been discovered; "the Silk-cotton tree (BOMBAX *pentandrum*) is so large, and spreads its branches so widely, that twenty thousand persons might stand under them: this tree is a native of Africa and America. The Adansonia, a native of Senegal in Africa, is said to grow to the size of seventy feet in circumference; this tree also attains great age. In 1749, the learned Adanson saw two of these trees in the neighborhood of Gorrea, upon one of which was inscribed the date of the fourteenth, and upon the other that of the fifteenth century! yet there were good reasons to suppose that the trees were not young when the dates were cut. It may be conjectured that they have sometimes attained to the age of eight or nine hundred years! an immense period of time for the existence of any species of organized bodies."*

LECTURE XXXIII.

CLASS XVI.—DIADELPHIA, TWO BROTHERHOODS.

249. THIS is the class of *two* brotherhoods, the stamens being united by their filaments into two sets. The flowers are *Papilionaceous.* It should be observed that there are some plants with *filaments united in one set*, but *with flowers papilionaceous* which are retained in Diadelphia though there be no apparent division in the brotherhood; and that though the flower be *papilionaceous*, if it have ten *separate* stamens it is placed in the tenth class. Linnæus, in reference to the form of the *flowers*, arranged this tribe under a natural order *Papilionaceæ;*—Jussieu regarding the *fruit*, called the same *Leguminosæ.*

Fig 148.

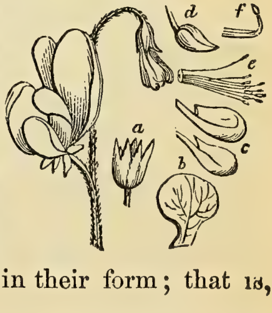

Fig. 148 represents the sweet-pea (*Lathyrus odoratus*); at *a* is the five-toothed calyx; at *b* the upper petal called the vexillum or banner; at *c* the *wings* or two side petals; at *d* is the *keel* formed of two petals united by their edges; at *e* are the *ten stamens, nine united,* and *one separate;* at *f* is the pistil, the base of which in process of time becomes the pod or *legume.*

250. The flowers of the leguminous plants are so peculiar in appearance that they are easily recognized. They are called by botanists *irregular.* The rose, pink, and bell-flower are regular in their form; that is,

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* B. S. Barton.

a. Adansonia.—249. Class Diadelphia—What circumstances to be observed with respect to this class?—Natural order Papilionaceæ—Leguminosæ—Describe Fig. 148.

there is a symmetry and equality in their parts. There may be slight inequalities in regular corollas; as in the lily we sometimes see some petals a little longer than the others; this is an exception to the general rule. Irregular corollas are various in their forms; the papilionaceous seem as they stand upon their stem to consist of an upper and under part; the calyx is monosepalous, ending in five distinct leafy points, the two upper ones wider than the three under ones. The peduncle is slender and flexible (see Fig. 148, *g*); thus the flower readily avoids a current of air by turning its back to the wind and rain. Suppose we have before us a pea-blossom; we see the corolla is *polypetalous.* The large petal covering the others and occupying the upper part of the corolla, is the *standard* or *banner.* This petal is evidently designed to protect the stamens and other parts of the flower from injuries by the weather. Upon taking off the banner we find that it was inserted by a little *process* or *projecting* part into the side pieces so that it could not easily be separated by winds. The wings are strongly inserted into the remaining part of the corolla. Upon removing the wings we discover a part of the corolla, called on account of its form the keel (*carina*), or boat. Upon drawing the keel downward, we find ten stamens (double in number to the petals) are joined together by the sides of their filaments, forming a cylinder which surrounds the pistil. One of the stamens, however, does not adhere to the rest; but as the flower fades and the fruit increases, it separates and leaves an opening at the upper side, through which the ovary can extend itself by gradually opening the cylinder. In the early stage of the flower, this stamen seems not to be separated; but by carefully moving it with a pin or needle, its filament will be found unconnected with the other nine stamens.

251. The ovary of the papilionaceous plant extends itself into that kind of pod called a *legume.* It is distinguished from the silique of the cruciform family by having no partition in the legume. Besides the seeds grow to one side only; but in the silique pod they are alternately attached to both edges of the partition. The legume opens lengthwise and rolls backward; in the silique, the valves separate and diverge from the base upward. The seeds of this family have a scar, or line, called the *hilum*, by which they adhere to the pod. Near the hilum there is a minute opening into the body of the seed, through which moisture is imbibed at the period of its first growth or germination. The ovule continues to swell, and at length bursts through the coats of the seed, presenting between the

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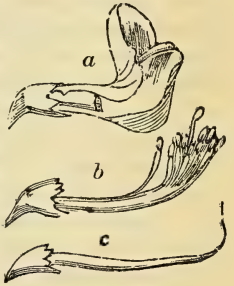
250. Regular and irregular corollas—Analysis of the pea-blossom.—**251.** Distinction between the legume and silique—Seeds of the leguminous tribe.

divided halves, or cotyledons, the first true leaves and the root.

252. *Order Pent-Octandria, from five to eight stamens.*—We could not expect from the character of the class, "stamens united into two sets," to find any plants with but one stamen. In this order we find the Corydalis, an elegant plant with bulbous roots; the corolla is rather ringent than papilionaceous. Fumaria is nearly allied to Corydalis by natural characters. In some cases the stamens have very broad bases, and scarcely seem united, as in the characters of this class. We find here Polygala, one species of which is called Seneca snake-root; this not only produces a beautiful flower, but is valuable in medicine. We have many species of this genus in our woods and meadows.

253. *Order Decandria, ten stamens.*—The *tenth Order* is wholly composed of plants with *leguminous pods;* the general character of these plants is, a calyx, often five-parted; corolla five-petaled, inserted on the calyx, and consisting of a banner, two wings and a keel; stamens generally ten, mostly united into two sets, nine and one; ovary free; style one; legume generally two-valved, one-celled, sometimes transversely divided into many cells; seeds affixed to the edge on one side. At Fig. 149, *a* is a papilionaceous flower; *b* shows the stamens divested of their petals; *c* the pistil, the ovary already exhibiting the form and appearance of the legume. In this large family of plants with leguminous pods, are many genera of great importance in the vegetable kingdom. The form of the corolla and the nature of the fruit, with few exceptions, settle the character of this class. The large family known as the natural order Leguminosæ, have been divided into three tribes: 1st, Papilionaceæ; with papilionaceous flowers, parts imbricated in æstivation, and upper one exterior, as the pea. 2d, Cæsalpinæ; flowers irregular, but not papilionaceous: we bring from the class Decandria to this tribe the Cassia. 3d, Mimosæ; flowers regular, petals valvate in æstivation.

Fig. 149.



254. The most savage nations usually cultivate leguminous plants. When Ferdinand de Soto marched his army into Florida before the middle of the sixteenth century, he found, according to an historian, the granaries of the natives "well stored with Indian corn and certain *leguminous seeds.*" The

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252. Order Pent-Octandria—Corydalis—Polygala.—253. General character of plants of the order Decandria.—Division of the Leguminosæ.—254. Leguminous plants long known.

bean and pea tribes are found here; they consist of severa. different genera, as the vetch plants (Vicia), in which are many cultivated species, and the indigenous one, *Americana.* The Phaseolus, or kidney-bean, has its native as well as exotic species. The pea (Pisum) differs from the Lathyrus in having the segments of the calyx equal and leaf-like; the vexillum (banner) has two protruding plaits. The native country of the cultivated pea (Pisum sativum) is said to be the southern part of Europe. The Sweet-Pea has a calyx with the two upper segments shortest. The vetch can hardly be distinguished from the sweet-pea, and also approaches to the edible pea. Its generic characters are, a calyx with three inferior segments straight and longer than the two above. The vexillum is emarginate, the style bearded beneath the stigma. The genus Ervum (lentile) is hardly to be known from the Vicia, except by its capitate, pubescent stigma. The genera Trifolium, Lespedeza, Hedysarum, and Medicago, have also many natural characters in common. In the Trifolium (clover) the flowers are quite small, and crowded in roundish, oblong heads; the legume is so diminutive as to be concealed within the calyx. The genus Lespedeza is distinguished by its lenticular, one-seeded, unarmed, indehiscent legume. There are many species of this plant with purplish flowers, trifoliate leaves, and minute, bristly stipules. The Hedysarum bears a oment commonly hispid. The Phaseolus is a genus of this eguminous tribe; all its species are trifoliate plants, with showy flowers, and weak, twining, or prostrate stems. The rattle-box (*Crotolaria*), with its inflated pericarp, is a favorite with children, who find it on sandy plains; it is a low pubescent plant with yellow blossoms. Of clover there are many species, as the red, yellow, white, &c. The locust tribe contains many ornamental shrubs and trees. Here are found the indigo (Indigofera) of the West Indies and Egypt, logwood from Campeachy, the *red sandal-wood* of the East Indies, the *liquorice*, and the *sensitive plant. Gum-arabic* is obtained from the acacia of the Nile (*Mimosa Nilotica*)*;* *liquorice* from the roots of the Glycyrrhiza, a native of Italy and France. The *tamarind* is a native of tropical regions; the Arabians and Africans allay their thirst by the cooling freshness of the pulp contained in its legumes. *Ebony* and *rosewood* are from the wood of plants of this tribe; *rice-paper* is derived from the *cellular* substance of another leguminous plant; the *tonka-bean* is the fragrant seed of one genus; and the East Indian senna is the product of a species of Cassia. Thus in the various genera of this tribe every part of the vegetable has its

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Bean and pea tribe--Indigo, liquorice, &c.

important uses; the root, bark (sometimes the outer bark, sometimes the liber), the leaves, flowers, pods and seeds. The arts and medicine depend greatly on this tribe, which also furnishes valuable fruits and food. Some plants of this class are poisonous. A traveler states, that the banks of the Nile are often visited in the night by the hippopotamus or river-horse, which does great damage to the gardens and fields; and that the inhabitants destroy the animal by placing a quantity of the *Lupine* seeds near where he is expected; these which he devours greedily, soon swell in his stomach and cause death.

255. The Furze (ULEX *Europœus*) is a common plant in Europe, though not found so far north as Sweden. It is a flower of so beautiful an appearance, that Linnæus, as is said, when he first beheld it, fell upon his knees in a transport of gratitude, and thanked the Author of nature for thus beautifying the earth.

256. A class called Polyadelphia, or many brotherhoods, having stamens united in *more than two sets*, was established by Linnæus, but the genera which it contained have been transferred to the class Polyandria; the St. John's-wort (Hypericum) is among the plants which were in the rejected class Polyadelphia; this in some species has its numerous stamens in *three clusters*, united by their filaments; but as all the species of the Hypericum are not thus divided into separate parcels of stamens, this distinction, as the character of a class, is laid aside; and the plants which were in the former class, Polyadelphia (*many brotherhoods*), are now placed in the class Polyandria (*many stamens*).

LECTURE XXXIV.

SYNGENESIA, UNITED ANTHERS.

257. WE have now arrived at a class which contains a large portion of the vegetable tribes found in blossom in the last summer months, and in autumn. The term Syngenesia signifies a *union* of *anthers*, which circumstance forms a difference between this class and those distinguished by a union of filaments: the number of stamens in plants of this class is mostly five, distinguished from the fifth class not only by the manner of inflorescence, but by a union of anthers forming a tube

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255. Furze.—256. Class Polyadelphia, why rejected?—257. Class Syngenesia—What does Syngenesia signify?—What are the characteristics of this class?

But if plants with five stamens have their anthers united, with no other resemblance to the Syngenesious plants, they are retained in the fifth class; the violet and impatiens are examples of this irregularity. This is an instance in which the *artificial* arrangement is made to bend to *natural* alliances. The term *compound flowers* was formerly applied to flowers crowded together on the same *receptacle* (*rachis*), and surrounded by a set of bracts or scales, forming an involucrum. These flowers have been distinguished into *tubular*, when the corolla of the perfect flowers forms a regular five-toothed tube; and this division is subdivided into flowers with heads *discoid*, and heads *radiate;* the second division is composed of florets where all are *ligulate* or strap-shaped, perfect, and arranged in a *radiating* head. The whole natural order is termed the *Compositæ*, sometimes the *Asteraceæ.*

258. The compound flowers (or Compositæ, as now called) begin to blossom in the latter part of summer, and are found bordering upon the verge of winter. The dandelion is among the earliest flowers of spring, and one of the latest of autumn. The daisy is found in almost every spot which exhibits any marks of fertility; these are not single flowers, like the violet or rose, but crowded clusters of little florets. The sun-flower (Helianthus) is considered as a type of the natural order *Compositæ*, which is sometimes called the *sun-flower tribe.* We distinguish the sun-flower into two parts—the *disk*, which is the middle of the flower, and supposed to have resemblance to the middle or body of the sun; the *ray* is the border of the flower, or those florets which spread out from the disk, as rays of light diverge from the sun. The inflorescence of the disk florets is *centripetal*, or from the circumference toward the center; the florets gradually expand. On examining a tubular disk floret, it is found to be perfect, containing one pistil surrounded by five stamens, forming by their united anthers a tube around the pistil. The florets of the ray are called neutral, having neither stamens nor pistils; the circumstance of *neutral florets in the ray* places the sun-flower in the order *Frustranea*, of the class Syngenesia.

259. A Clover blossom is a collection of many little flowers united—but each little floret of the clover has its own calyx; there is no general calyx inclosing the whole, as in most of the Syngenesious plants; the anthers are separate, the *filaments connected at their sides*, which circumstance, together with the papilionaceous form of the corolla, places the clover in the class Diadelphia.

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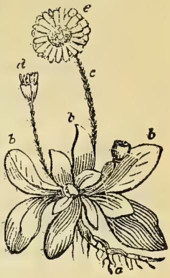
258. Compositæ, when found in bloom ?—Describe the sun-flower.—259. How does a clover blossom differ from a compound flower ?

Fig. 150.



a. Analysis of the Mountain Daisy.—The *Root* (Fig. 150, *a*) is *fibrous;* from these fibers spring out tubercles; the root is said to be *fibrous-tubercled.* The *Leaves* (*b*) are *radical*, springing from the root; *simple*, because they are undivided; *obovate*, with the somewhat oval form being narrowed toward the stem; *ciliate*, having hairs upon their margin. The *Stem* (*c*) is called a *scape*, because it springs directly from the root and bears no leaves; it is *simple* and *pubescent.* The *Calyx* (*d*) is *hemispherical;* it is *common*, that is, incloses many florets; the leaflets of the calyx, sometimes called *scales*, are *equal.* The *Corolla* (*e*) has many florets on one expanded *rachis* or receptacle; it is *radiate*, having rays; the florets of the disk are *tubular* (Fig. 151, *a*), perfect flowers, funnel-shaped, and five-toothed; the florets of the ray (*b*) ligulate: they have pistils without stamens. The *Stamens* (*c*) *are five, united* by their anthers, forming a tube. The *pistil* in the disk florets passes up through the tube formed by the anthers (*d*); the stigma is parted into two divisions, which ar *reflexed.* The plant has no *pericarp* or seed-vessel; the seeds (achenia) grow upon the rachis (*e*), they are single, naked, or destitute of the downy plume called *egret* which is seen upon the dandelion and many other of the syngenesious plants. The *rachis* is *conical;* it is dotted with little holes, these are the places in which the seeds were fixed; the appearance of the rachis, whether naked or chaffy, sometimes constitutes a distinction between genera of the syngenesious plants. This seed belongs to Mirbel's genus of fruits, *Cypsela.*

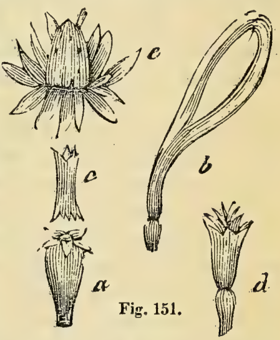


Fig. 151.

b. The botanical name of the daisy is BELLIS *perennis.* It belongs to the artificial class Syngenesia, because the anthers are united; order 2d, Superflua, because the pistils in the ray are superfluous, having no stamens. The generic name, *Bellis,* is from an ancient Latin word, *belles,* handsome; from which comes also the French word *bel;* the specific name, *perennis,* signifies that it is a perennial plant, or one whose roots live several years. The *common name, daisy,* is derived from a property which many petals of the syngenesious plants possess of folding themselves at the setting of the sun, and expanding with its rising. The poet Chaucer, who lived in the fourteenth century, is said to have first noticed this circumstance, and to have called the flower *day's-eye.*

260. The orders of the class Syngenesia are founded on the situation of the several kind of florets. These florets are, *perfect*, such as have both stamens and pistils; *barren*, or *staminate*, having only stamens; *fertile*, or *pistillate*, having only pistils; *neutral*, destitute of either stamens or pistils. The five orders in this class depend on the various situations of these different kinds of florets.

261. *Order Æqualis.*—The *first Order* contains those flowers of this class which have all the florets perfect or *equal;* this order is divided into three sections.

1st. Containing such as have *ligulate* florets; as the dandelion, lettuce, and vegetable oyster. 2d. Florets *tubulous*, with flowers in a head; as the thistle, and false saffron (*Carthamus*).

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a. Describe Fig. 144.—*b.* Botanical name, class, and order of the daisy.—260. Orders of the class Syngenesia, how distinguished?—Different kinds of florets.—261. Order Æqualis, divided into three sections.

3d. Florets *tubulous*, without rays; as boneset or thorough wort (*Eupatorium*).

262. *Order Superflua.*—The *second Order* presents us with such syngenesious flowers as have the florets of the disk *perfect*, and those of the ray only *pistillate*, each pistil producing a perfect seed. The pistils in the ray, being unaccompanied with stamens, are considered as *superfluous*.

This order is divided into two sections. 1st. Flowers *without rays*, or the ray florets indistinct; here we find the tansy and the life-everlasting. The ARTEMISIA, a genus which includes the wormwood and southern-wood, both exotics, has but few native species. The name Artemisia is often improperly given to an ornamental plant which belongs to the genus Chrysanthemum. "The genus Artemisia was named in honor of Artemis, the wife of *Mausolus*, whose monument was one of the wonders of the world (hence our word Mausoleum). Pliny observes, that women have had, also, the glory of giving names to plants."* 2d. Flowers with ligulate petals forming rays, the receptacle being naked, as may be seen on the dandelion after the petals have fallen off. The Aster genus contains numerous species which blossom late in the summer and autumn. Many of these species are highly beautiful, presenting a great variety of rich and delicate coloring, from the dark blue, purple, and red, to pale blue, light violet, and pink, and in many cases pure white. In some the yellow prevails; sometimes they are variegated, and often the disk and ray are of different colors. After having once become familiar with the Aster genus it is easy to distinguish it, though often difficult to determine the species; but comparison and research strengthen the mind, and the greater the difficulties overcome, the greater will be the mental advantage. Nearly allied to the *aster* is Chrysopsis, with corymbs and yellow flowers. In this class and order is found the African marigold (Tagetes), a Mexican genus; two species are distinguished by five permanent florets in the ray. The *Zinnia* has much the look of Tagetes, but has an imbricated, round-scaled calyx, and five or more remarkably persistent, broad rays. The golden-rod (SOLIDAGO) consists of many species; in some, the flowers are arranged in one-sided racemes, in others they form small and irregular clusters. The species are in many cases faintly distinguished. The genus CHRYSANTHEMUM contains the common daisy, sometimes called ox-eye; it also includes many splendid foreign plants, mostly of Chinese origin. The Dahlia is at present a favorite with florists who enumerate many splendid varieties.

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* Thornton's British Flora.

262. Order Superflua, how divided?—1st section—Artemisia—2d section—Aster—Golden-rod—Chrysanthemum—Dahlia.

263. *Order Frustranea.*—The *third Order* has the *disk florets perfect;* those of the *ray* are *neutral;* an abortive seed is sometimes seen at the base of the florets; the name *Frustranea* alludes to this *imperfect seed.* The Sun-flower (Helianthus) is a very good plant to examine, as the organs are large and develop clearly the peculiar character of its natural and artificial alliances. Fig. 152, *a*, represents the flower of the Coreopsis; *b*, a floret of the disk, with its bifid stigma above the tube formed by the united anthers; *c* shows a ray floret, which is neutral. In this order is the Centaurea *benedicta*, or blessed thistle, a native of Spain, which received its name on account of some extraordinary virtues which it was thought to possess.

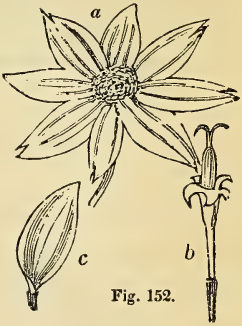

Fig. 152.

264. *Order Necessaria.*—The *fourth Order* includes plants in which the *rays* only are *pistillate*, the *disk florets* staminate. We find here the pot-marigold (Calendula), a cultivated plant, commonly with orange-colored leaves and stem; sometimes used for soups.

265. *Order Segregata.*—The *fifth Order* contains genera, with each floret having a calyx proper to itself, besides a common calyx including the whole of the florets which make up the flower; this may be called a *doubly-compound* flower. The only plant of this order yet discovered in the United States is the elephant's-foot (Elephantopus), a low, hairy-leaved plant, with purple, ligulate florets.

266. The plants of the class Syngenesia were, by Jussieu, subdivided as follows: 1st. Those with florets all *ligulate* and *perfect; leaves alternate, having milky juice;* corollas mostly yellow. This includes the dandelion and lettuce. 2d. Compound flowers with *tubular corollas;* with *receptacles fleshy* and *chaffy; egret stiff* and *bristly; leaves often with harsh prickles; flowers in a head.* This includes the thistle, burdock, and false saffron. 3d. Such compound flowers as have their *inflorescence clustered in a corymb;* as the life-everlasting, boneset, and aster. The plants of the class Syngenesia are, in general, easily recognized at the first glance.

a. A botanist observes, "Syngenesious plants have a weed-like appearance, notwithstanding the beauty of their coloring; the stems and leaves are often rough, and they seem to have been less completely reclaimed from their savage state than most other plants, with the exception of the Cryptogamous class."* Few plants of this class are poisonous; for though milky plants are generally so, those of this class are exceptions. The lettuce contains a narcotic principle, and opium may be made from it. The dandelion, thoroughwort, chamomile, and wormwood, with many other plants of this class, are valued for medicinal properties. The *Compositæ* are abundant in our own country, and the botanical student can never find difficulty in procuring specimens of this natural order. In commencing botanical studies with the flowers of spring, nature gradually presents us with those that are more and more difficult to investigate. The Compositæ bloom mostly in the latter part of the season. Being previously prepared by a knowledge of the general principles of classification, and observations of plants, this great natural order may be studied with satisfaction; whereas, if a course of botanical study were to be commenced with these plants, the student would find himself thrown amidst a chaos of facts with no clew to their arrangement.

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* Barton.

263. Order Frustranea—Sun-flower—Coreopsis—Blessed thistle.—264. Order Necessaria.—265. Order Segregata—Elephant's-foot.—266. Jussieu's division of compound flowers.

LECTURE XXXV.

GYNANDRIA, STAMENS ADHERING TO THE PISTIL.

267. WE shall now examine a class in which an entirely new circumstance from any yet considered, is regarded as forming its essential character: this is the *situation of the stamens upon the pistil;* the stamens adhering to that organ. In some cases the stamens proceed from the ovary, in others from the style. There is sometimes difficulty in deciding as to the number of stamens, for they are not here, as in other classes, distinct organs, but in some cases mere collections of glutinous pollen, called *pollinia.* The column formed by the union of the stamens to the pistil is called a *gynostanium*, from *gune*, pistil, and *aner*, stamen.

268. *Order Monandria, one stamen.*—The orders in this class, as in Monadelphia and Diadelphia, depend on the number of stamens or *pollinia.* The first order contains such plants as have but one stamen, or two masses of glutinous pollen, equal to one stamen; this order is divided into sections, with reference to *the manner in which the anther is attached to the style;* whether *easily separated,* whether *the anther coheres to the top of the stigma,* and also to *the shape of the masses of pollen* which are called the anther.

269. The type of the natural order *Orchideaceæ* is the *orchis* genus, consisting of many species of perennial plants which grow in shady, moist places; some are parasites, adhering to the bark of trees by their fleshy, tuberous stems, and fibrous roots. The corolla shows a division into six parts as in lilies, but these are of different forms, and in several combinations; five of these parts are always external, but frequently in two ranges, as in orchis, where the three external resemble a calyx; and there are then two internal divisions like petals, closing together beneath one of the external segments, so as to resemble a hood or helmet. The sixth segment or lip (for these flowers always

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a. Plants of this class valued for medicinal properties—Found in the latter part of the season.—267 Class Gynandria.—268. 1st order.—269. Natural order Orchidaceæ.

appear as ringent) exhibits the most varied forms; it is situated opposite to the style, which is often petaloid, and seems to form an upper lip in accordance with the lower or true petal. In Orchis this sixth petal is often trifid, and sometimes divided into fringe or hairs; its base terminates in a seed, or elongated nectiferous cavity. Most of the species of Orchis have more recently been transferred to the genus *Habenaria.*

270. The roots of the Orchis sometimes consist of two solid bulbs; in other cases they are oblong, fleshy substances, tapering toward the ends like the fingers of the hand. The name Orchis is derived from a Greek word, signifying an olive-berry, on account of some of the roots being round like that fruit. Anthers always one or two, and from one to four-celled, sessile, or sitting upon the side or apex of the style; the pollen is easily removed from the cells in glutinous masses; the styles are simple, with viscous stigmas of various forms and positions. The capsules are one-celled, three-valved, three-keeled; the seeds are numerous and dust-like; the leaves clasp the stem like the leaves of grasses. The Orchis family are *monocotyledons* and *exogens.* Their roots are tuberiferous. The flowers are remarkable for their irregular appearance; some present the figure of a fly, others of a spider, a bird, and even of the human figure. It would seem that the freaks of these vegetable beings are not designed for our observation, for they are as peculiar in their choice of habitations as in their external forms, preferring wildness, barrenness, and desolation, to the fostering care of man, or the most luxuriant soil. The aromatic *vanilla* is obtained from the fruit of a climbing orchis of equatorial regions: many of the *Epiphytes*, or air-plants, which appear in great perfection in those regions, are Orchidaceous; they are called air-plants in allusion to their mode of nourishment, the roots merely adhering to the bark of trees, or sometimes hanging loose; these plants are called Epiphytes, or parasites, though they do not derive their sustenance through other plants.

Fig. 153 represents a flower of this tribe; *a* shows the two masses of pollen brought out from the cells of the anther which is attached to the pistil.

271. *Order Diandria, two stamens*, contains the lady's-slipper (Cypripedium); the lip is large, inflated, and resembles a slipper. Some species are yellow, some white, and others purple. *Order Pentandria, five stamens*, contains the milk-weed (As-

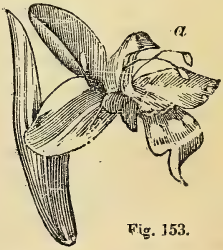

Fig. 153.

CLEPIAS); this has been placed in the fifth class, on the supposition that the stamens do not proceed from the pistil; but its masses of pollen (pollinia) render it plainly gynandrous. *Order Hexandria, six stamens*, contains the Virginia snake-root (ARISTOLOCHIA *serpentaria*), a perennial plant with brown fibrous roots; it is found in shady woods from New England to Florida. It is found by chemical analysis to contain "pure camphor, a resin, a bitter extractive, and a strong essential oil." It was used by the Indians as a remedy for the bite of a snake; from this circumstance is derived its name. This plant, in its medicinal properties, differs essentially from the POLYGALA *senega*, or Seneca snake-root, and the mistaking one for the other might, in critical stages of disease, be attended with fatal consequences.* *Order Decandria, ten stamens.*—We here find the wild ginger (ASARUM); this is a native plant, so low that its flowers are almost concealed in the ground; the roots are creeping and aromatic.

272. Although many species of the class Gynandria are indigenous we cannot readily procure specimens of many of its genera. The lady's-slipper, milk-weed, and dog's-bane, may be obtained, but many of the plants of this family opposing all attempts at cultivation, are to be found only in the depths of the forest, or places little frequented by man; like the aboriginal inhabitants of America, they seem to prefer their own native wilds to the refinements and luxuries of civilized life.

LECTURE XXXVI.

MONŒCIA, ONE HOUSEHOLD.—DIŒCIA, TWO HOUSEHOLDS.

273. IN all the classes hitherto examined, we have found *perfect flowers.* Our present inquiry is to be directed to two classes, in which the flowers are *imperfect*, or *both stamen and pistil are not found in the same individual flower.* The *staminate* flowers are *barren*, they bear no fruit; the pistillate flowers, after being fertilized by the pollen from the infertile flowers, produce the fruit.

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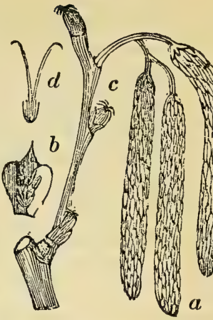
* A physician prescribed for a sick child the *Seneca snake-root* (POLYGALA *senega*); an ignorant apothecary sent the *Virginia snake-root* (ARISTOLOCHIA *serpentaria*), supposing *one kind of snake-root would answer as well as another.* The physician having, fortunately, remained to inspect the medicine which he had ordered, the mistake was seasonably discovered. This instance shows the importance of botanical knowledge, particularly in those who attempt to deal in medicine. Had the mother of the child understood botany, the mistake would have been discovered although the physician had not been present.

Hexandria—Snake-root—Decandria.—272. Concluding remarks.—273. In what respect do the two next classes differ from the preceding ones?

Fig. 154



274. Class Monœcia—contains plants where *growing from the same root* we find some flowers *containing only stamens*, others *only pistils.* The *orders* in this class are determined by the *number of stamens in each flower.*

Order Monandria, one stamen.—We find here the Bread-fruit tree (Artocarpus), which grows to the hight of forty feet, having fruit of the size of a large watermelon hanging from its boughs. This tree is a native of the East Indies; the fruit when roasted resembles wheat bread, and is much valued for food. This plant belongs to the natural order *Urticaceæ*, in which are the Fig and Mulberry.

275. *Order Triandria, three stamens*—contains *the cat-tail* (Typha); this grows in swampy meadows and stagnant waters, to the hight of four or five feet. The long brown spike which grows at the summit of the stem (giving rise, from its peculiar appearance, to the name cat-tail) is the *catkin;* the upper part consists of *staminate flowers*, having neither calyx nor corolla; the three stamens arising from a chaffy receptacle. The *pistillate flowers* form the lower part of the spike; each one produces a seed supported by a kind of bristle. The leaves and stems of the Typha are employed for bottoming chairs and making mats; the pollen is very abundant, and is inflammable.* The *sedge* (Carex) consists of nearly two hundred species. Though a grass-like plant, it is separated from the family of grasses, which are mostly in the third class, on account of the monœcious character of its flowers. The *sedge-grass* belongs to the natural order *Cyperaceæ;* the genus Cyperus being the type. This tribe of coarse grasses inhabit marshy grounds; though resembling the true grasses in their general aspect, they differ from them in having stems without joints, and often triangular. Unlike the grasses, they are of little utility; they spread rapidly, and often destroy the best pastures by overrunning them. A species of Cyperus, the *papyrus*, which grows in abundance on the banks of the Nile, was used by the ancients in the manufacture of a kind of thick paper; a thin, fibrous membrane was obtained from the stem, and several thicknesses being glued together, the whole was pressed into sheets. This parchment is still to be seen in ancient records, and offers to the observation of the curious, the authographs of Egyptians, Greeks, and Romans. (See Plate vi., Fig. 5.) The Indian corn (Zea *mays*) is found in

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* See Plate i., Fig. 6.

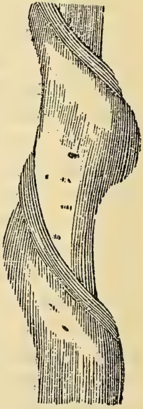
274. Class Monœcia.—274. Order Monandria—Bread-fruit.—275. Cat-tail—Sedge—Indian corn, &c

this order. The *top or panicle consists* of *staminate flowers* only, and of course never produces corn; the *pistillate flowers grow in a spike inclosed in a husk; each pistil produces a seed called corn;* the pistils are very long, forming what is called *silk.* This genus belongs to the natural order Gramineæ.

276. *Order Tetrandria, three stamens.*—We here meet with the mulberry (Morus) whose leaves furnish nourishment to the silk-worm. The white mulberry, MORUS *alba*, is the species which is chiefly used for this purpose. This plant is classed with the bread-fruit and fig in the natural order Urticaceæ. *Order Pentandria, five stamens*—contains the genus AMARANTHUS, in which is a very common weed, with some analogy to the pig-weed, not only in natural properties, but in being dignified with a name which forms a striking contrast with its mean appearance. This genus, however, contains some elegant foreign species; one of which, AMARANTHUS *melancholicus*, has received the whimsical name of Love-lies-bleeding; probably from the circumstance of its long, red flower-stalks drooping and often reclining upon the ground. Another species, called Prince's-feather, is always erect. The Cock's-comb is a well-known plant of this genus; the flowers form a *crest* at the apex of a flattened peduncle. In some countries the Globe Amaranth is used for adorning the churches in winter, the colored bracts retaining their hue for a long time.

277. *Order Polyandria, many stamens*—contains many of the most useful and beautiful of our forest-trees, forming the natural family *Amentaceæ.* Fig. 154 represents a branch of the Corylus (Hazle-nut); at *a* are the *aments*, or catkins, *formed of staminate flowers;* at *b* is a bract, or scale of the ament with adhering stamens; at *c* are the *pistillate flowers surrounded with scales;* at *d* is a pistillate flower, having two styles. The oak, beech, walnut, chestnut, birch, &c., bear their staminate flowers in nodding aments; their pistillate flowers are surrounded with scales for calyces. The stems of these plants are woody and exogenous; such stems increase in diameter by new wood being formed around the old; the new wood is formed from the cambium which flows downward between the wood and bark. Fig. 155 shows a portion of the trunk of an oak, supporting the stem of a twining plant (Celastris *scandens*, the staff-tree). As the oak is a dicotyledonous tree, its trunk is annually increased by new layers which are developed between the bark

Fig. 155.



and wood; hence it will be seen, that if any foreign substance encircles the trunk it must in time produce a protuberance. The cambium from which the new layers are formed is interrupted in descending, and accumulates just above the interposing body, forming the swellings that appear there.

278. The genus Calla includes the elegant exotic, Calla *ethiopica*, or Egyptian lily. The flowers having neither calyx nor corolla, grow upon a spadix; the staminate and pistillate flowers are intermixed, the anthers are sessile; the berries are one-celled, many-seeded, and crowned with a short style. This spadix thus covered with the fructification stands erect, surrounded by a spreading, ovate spatha; this, in the Egyptian lily, is of pure white, presenting a very showy appearance and might be taken for the corolla. The Calla *palustris*, a very common American plant, is represented at Fig. 156; at *a* is the *spatha*, which is *ovate*, *cuspidate*, and *spreading;* at *b* is the spadix covered with the fructification, the staminate and pistillate flowers being intermixed and uncovered; at *c* is a pistil magnified, showing the style to be very short, and the stigma obtuse; at *d* is a stamen bearing two anthers. The wild-turnip (Arum) is nearly allied to the Calla, and the type of the natural order *Araceæ*, having flowers on a spadix with a fleshy rhizoma, or cormus, and large, sword-shaped, or arrow-shaped leaves. The arrow-head (*Sagittaria*), of the *water-plantain tribe*, is unlike most of the Monœcious plants in general appearance; it has three sepals and three white petals; it is not unlike the spider-wort in the form of its flowers. Many species of this delicate-looking plant may be found in autumn in ditches and stagnant waters.

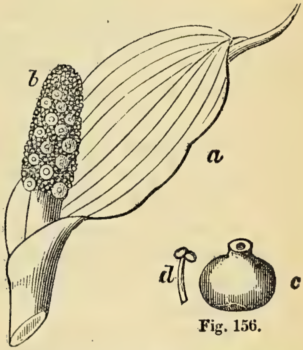


Fig. 156.

279. *Order Monadelphia*, or that in which the *filaments* are united in a column, presents us with the Cucumber tribe (*Cucurbitaceæ*); this includes not only the proper Cucumis, or cucumber, which is an exotic, but some native genera of similar plants; we find here the gourd, squash, watermelon, and pumpkin. These plants have mostly a yellow five-cleft corolla; calyx five-parted, three filaments united into a tube; a large berry-like fruit, called a pepo; this in the melon is ribbed, and in the

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278. Calla—Different species—Family Araceæ—Arrow-head.—279. Order Monadelphia—Cucumber tribe.

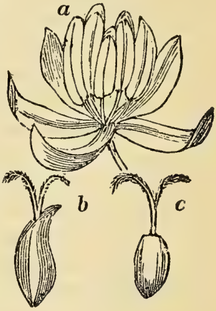
cucumber uneven and watery. We find in the same artificial order a very different family of plants, called *Coniferous* or *cone-bearing* plants; these have the staminate flowers in aments, each furnished with a scale or perianth supporting the stamens; the pistillate flowers are in strobilums, each furnished with a hard scale. The stems are woody, the leaves evergreen, and the juice resinous. To this natural family belong the pine and cypress.

280. The character of trees may be studied to advantage at four different seasons: in *winter*, when the forms of the ramification can be seen in the naked boughs, and the leaf and flower-buds examined in their inert state; in *spring*, when in blossom; in *summer*, when the foliage is in perfection; and in *autumn*, when, during the first stages of decay, the mellowness and variety of tints afford beautiful subjects for the pencil of the painter, and for those who love the study of nature under all her forms.

281. The Class Diœcia (two houses) has *staminate* and *pistillate flowers* on *separate plants*. The *distinction with regard to the orders*, as in the preceding class, is derived from the *number of stamens*.

Here are no plants of the *first order*, or with one stamen.

Fig. 157.



282. *Order Diandria, two stamens*—contains the willow (SALIX), which has long and slender aments both of staminate and pistillate flowers, the two kinds being on separate trees. The order *Triandria* contains the fig (FICUS), remarkable for containing the flower within the fruit, which is botanically considered as a juicy receptacle within which are concealed the minute flowers and seeds. The fig is peculiar to warm countries. Order *Tetrandria* contains a parasitic plant, the *Mistletoe* of the oak (*Viscum album*). The Druids* considered this plant as sacred to the silvan deities. Tradition relates that where Druidism prevailed the houses were decked with this plant that the silvan spirits might repair to them. The fruit of the mistletoe contains a viscid matter by means of which the seeds adhere to the trees; in germinating, the seeds send their radicles into the bark of the plant to which they are attached, and from which this true parasite receives its nourishment.

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* The Druids, it is supposed, derived their name from *drus*, a Greek word signifying oak, as it was in groves of this tree that the priests celebrated their mysterious rites, and sacrificed human victims to their sanguinary deities.

Cone-bearing plants.—280. Appearance of trees at different seasons.—281. Class Diœcia.—282. Willow—Fig—Mistleton.

283. The order PENTANDRIA contains the hemp, hop, &c. Fig. 157 represents the flowers of the hemp (*Cannabis sativa*); at *a* is the *staminate flower*, containing five stamens, calyx deeply five-parted, corolla wanting. At *b* is a *pistillate flower* with its calyx opening laterally; *c* shows the same flower divested of its calyx; the seed, a nut crowned with two styles. The hemp belongs to the natural order *Urticaceæ* (from *urtica*, a nettle); the fibers of its stems are manufactured into cloth, cordage, and thread; the hop, of the same natural family, produces its fertile flowers in large cones or strobilums, formed of membraneous, imbricated scales; these flowers have a peculiar odor, which produces a narcotic effect upon the brain. The use of the flowers of the hop to produce fermentation in beer is well known. This plant contains a small portion of the nitrate of potash (saltpetre). HEXANDRIA contains the genus *Smilax*, the type of the *Smilaceæ* or sarsaparilla family. Linnæus considered the species of the Smilax which furnishes the *sarsaparilla* a native of the United States only, but it is indigenous to South America. The rhizomes furnish the medicinal parts of the plant. OCTANDRIA contains the poplar (POPULUS), similar in natural character to the willow. MONADELPHIA, or the fifteenth order, contains the red-cedar and the yew, which, with the pine and cypress, belong to the cone-bearing family.

LECTURE XXXVII.

CLASS XXI.—CRYPTOGAMIA, STAMENS AND PISTILS INVISIBLE OR WANTING.

284. THE Cryptogamous class is the last in the system of Linnæus. The name *Cryptogamia* implying a concealed union in reference to stamens and pistils is not well chosen, since in some productions belonging to this class there are no evidences of the existence of such organs. We here find the stamens and pistils either wholly concealed from observation, or only manifest upon the strictest scrutiny. These plants constitute the first class of Jussieu's method called *acotyledonous*; their seed being destitute of any cotyledon. As we proceed in this last of the Linnæan classes, we shall find all our former principles of arrangement fail us, and it might almost seem as if we had entered upon a new science. Ferns, mosses, lichens, and mushrooms, constitute the principal families of this class

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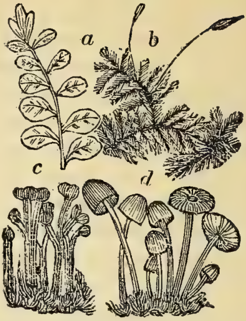
283. Urticaceæ—Order Hexandria—Octandria—Monadelphia.—284. Class Cryptogamia.

Fig. 158



At Fig. 158, *a* is a fern, of the genus Asplenium, which bears its fruit on the back of the fronds; at *b* is a moss of the genus Hypnum, showing two of its flowers borne on slender pedicels. At *c* is a genus of the Lichen family. At *d* is the Agaricus, one of the most common of the mushrooms. It has been said, that Linnæus, having arranged all plants which would admit of classification, cast the remainder into a heap together, which he called *Cryptogamous;* he did not, however, rest satisfied in thus throwing them together, but subdivided this miscellaneous collection into orders; or we might more properly say that he gave names to those divisions already marked out by nature.

285. *Order Filices, or Ferns.*—The *First Order* contains the Ferns; their plume-like leaves are called *fronds.* The fructification consists of one-celled *spore-cases* (called *thecæ* or *sporangia*) which open in various ways and discharge the numerous minute spores. The fruit (sporangia), mostly disposed in dots or lines, grows on the back, summit, or near the base of the *frond.* Fig. 159, *a*, represents the genus POLYPODIUM, with sporangia in roundish spots on the back of the frond; *b*, ASPLENIUM, in lines nearly parallel, diverging from the center of the frond; *c*, BLECHNUM, sporangia in uninterrupted lines running parallel to the midrib of the frond on both sides; *d*, PTERIS, or brake, sporangia forming lines on the edge of the leaf. Some ferns bear their fruit in a peculiar appendage, as a spike or pro-

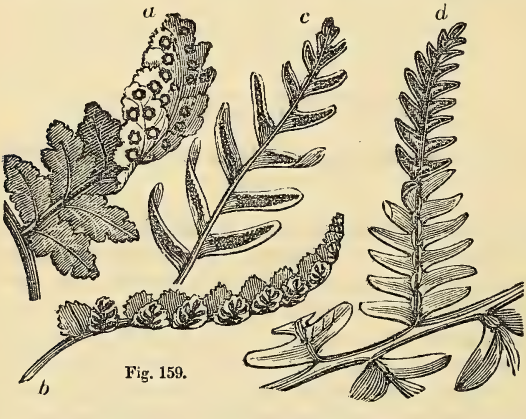


Fig. 159.

tuberance in the axils, or at the base of the leaves; no appearance of flowers in these plants is ever presented. When the brown or white dust-like spots (*sori*) are examined with a microscope, they are found to consist of clusters of very small spore-cases, at first entire, but afterward bursting elastically and irregularly. Besides attention to the situation and form of the sporangia, it is necessary to observe the membrane which envelops them; this is called their *involucrum* (or *indusium*).

The spores are minute as the finest powder, and so light as to be wafted by the air to any distance or hight. Some ferns grow to a great hight in southern latitudes, almost like trees. One species, ONOCLEA *sensibilis*, the *sensitive fern*, is said to wither on being touched by the hand, though the touch of other substances does not produce the same phenomenon. The stem of the fern is a rhizome, which creeps along under the surface of the ground, sending off roots and leaves, or an *ærogenous trunk*. Some of the ferns are used medicinally; the sirup, called *capillaire*, is prepared from the ADIANTUM *capillas*. A species of Aspidium is covered with a woolly substance, and is hence called the Tartarian lamb. The number of species of ferns which are already known, amounts to about two thousand, the number of genera to one hundred and eighty-three. Ferns abound in moist and shady situations; they are sometimes found on rocks and dry places, on the trunks and branches of trees, or on the summits of old buildings. The frond, or leaf of the fern, is often *pinnate*, or divided like a feather; sometimes it is undivided, and resembles a palm-leaf. The EQUISETUM *hyemale* is known to housekeepers under the name of *scouring-rush*. The quantity of silex contained in the cuticle renders it a good substitute for scouring-sand.

286. *Order Musci*—contains the *mosses*, which are little herbs with distinct stems; their conical, membraneous corolla is called a *calyptra*, or veil; this veil clothes the capsules, which, before the seeds (*sporules*) ripen, is elevated on a foot-stalk. The capsule, called *theca*, is of one cell, and one valve, opening by a vertical lid; the seeds are very numerous and minute. In some genera the veil is wanting; this serves as a distinction in the order *Musci*. The barren flower of mosses consists of a number of nearly cylindrical, almost sessile anthers; the fertile flowers have one perfect pistil, seldom more, accompanied by several barren pistils. Both stamens and pistils are intermixed with numerous succulent threads. Fig. 160, *a*, represents the *theca*; *b* the *pedicel*, or stem; *c* the *sheath*; *d* the *operculum*, or lid, which, before the theca is ripe, is covered by the calyptra; *e* the *calyptra*, or veil; *f* the *fringe*, or teeth, which, when the

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Sensitive fern -Number of species of ferns—Scouring-rush.—286. Mosses

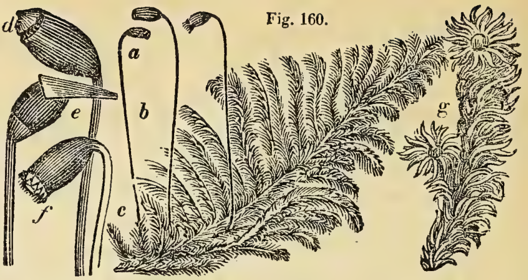

Fig. 160.

theca is ripe, and has thrown off its other parts, often appear around its edge; *g* the barren or staminate flower of a moss. The mosses are mostly perennial and evergreen, and capable of growing in colder climates than most other vegetables. In Spitzbergen, the rocks which rise from the surrounding ice are thickly clothed with moss. A botanist who traveled in Greenland, counted more than twenty different species of moss without rising from a rock where he was seated.

"Mosses and Ferns," says Thornton, an English botanist, "by the inconsiderate mind, are deemed a useless or insignificant part of the creation. Thus much we are certain of, with respect to mosses, that as they flourish most in winter, and at that time cover the ground with a beautiful green carpet, in many places which would otherwise be naked, and when little verdure is elsewhere to be seen; so at the same time, they shelter and preserve the seeds, roots, germs, and embryo plants of many vegetables, which would otherwise perish. They furnish materials for birds to build their nests with, they afford a warm winter's retreat for some quadrupeds, such as bears, dormice, and the like, and for numberless insects which are the food of birds and fishes, and these again the food or delight of men. Many of them grow on rocks and barren places, and by rotting away afford the first principles of vegetation to other plants, which never else could have taken root there. Others grow in bogs and marshes, and by continual increase and decay, fill up and convert them into fertile pastures, or into peat-bogs, the source of inexhaustible fuel to the polar regions. They are applicable also to many domestic purposes The *Lycopodiums* are used in the dyeing of yarn, and in medicine; the *Sphagnum* (peat-moss) and *Polytrichum* furnish convenient beds for the Laplanders, and the *Hypnums* are used in the tiling of houses, stopping crevices in walls, packing brittle wares and the roots of plants for distant conveyance. To which may be added, that all in general contribute entertainment and agreeable instruction to the contemplative mind of the naturalist, at a season when few other plants offer themselves to his view. The Fungi have been suspected by some to be, like sponges and corals, the habitations of some unknown living beings, and being alkaline, have been classed in the animal kingdom; but they are known to produce seeds, from which perfect plants have been raised; and the celebrated Hedwig, by great dexterity of dissection, and by using microscopes of very highly magnifying powers, assures us that he has discovered both stamens and pistils, not only in this order of plants, but in the other orders of the Cryptogamous family."*

287. *Order Hepaticæ* (Liverworts)—contains *frondose*, or moss-like plants, which are more succulent or juicy than the mosses; they have four-valved thecæ, which circumstance, and that of their not opening with a lid, distinguish them from the mosses

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* Notwithstanding the weight which Thornton gives to the opinion of Hedwig and others, it is, at present, much doubted by naturalists, whether the Fungi have organs analogous to stamens and pistils.

Explain Fig. 160—Mosses capable of enduring cold—*a*. Remarks of Thornton.—287. Liverworts.

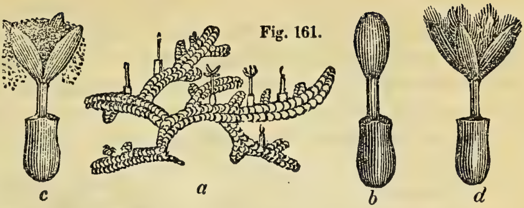
Fig. 161.

Fig. 161 represents a species of the *Jungermannia complanata*, as represented under a magnifier. *a*, a plant of natural size, in fruit. *b*, the fruit magnified, showing the sheath, the peduncle rising from it, and the theca at top, not yet burst. *c*, the open capsule splitting and discharging the seeds. *d*, the theca empty, showing its four valves.

288. *Order Algæ* includes the sea-weeds and green mosses of vegetable cells seen floating on stagnant water, and sometimes vulgarly called frog-spittle; they are almost always aquatics; generally green or reddish. One genus of this family is the *Fucus*. The Fucus *natans*, sometimes called the gulf-weed, is very abundant in the Gulf of Florida, and is found in various parts of the ocean, forming masses or floating fields many miles in extent. The plant seems to possess no distinct root, though it perhaps originally vegetated on some sea-beaten shore from whence it was by accident thrown upon the ocean's wave. The Fucus *giganteus* has a frond of immense length.

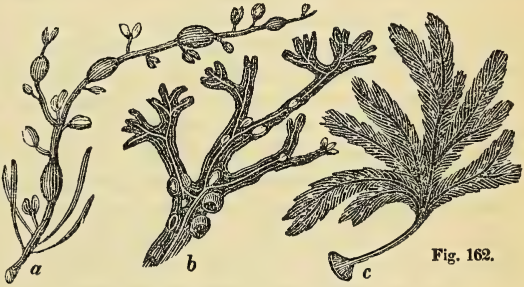
Fig. 162.

Fig. 162* represents three kinds of Fuci.† *a* is Fucus *nodosus* (knobbed fucus); this has forked fronds; the knobs appearing in the fronds are air-bladders, which render the plant buoyant upon the water; it is often more than six feet in length. *b*, Fucus *vesiculosus* (bladder fucus); here the air-bladders are mostly axillary, and at the sides of the midrib; in some parts of Lapland it is boiled with meal, and given for food to cattle. *c*, Fucus *serratus;* it has a beautiful *serrate* frond. The Fuci when burnt afford an impure soda, called *kelp*.

289. *Order Lichenes.*—According to Linnæus, the *fifth Order* of Cryptogamous plants contains the Lichens; these are various

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* See also Appendix, Plate viii., Figs. 8, 9, 10, 11.

† Fuci is the plural of Fucus.

288 Sea-weeds—Fuci—Gulf-weed—Three kinds of Fuci.—289. Lichens.

in texture, form, and color; they are leathery, woody, leaf-like, white, yellow, green, and black; they are seen on stones, old fences, and buildings; some with strong, green filaments are suspended from branches of trees, and improperly called mosses. The fruit of the Lichen consists of cups or shields called *apothecia*, in which the seeds are contained. Fig. 163, *a*, represents a lichen of a leaf-like appearance; here the apothecia, imbedded in the *thallus*, are very apparent. *b* is a lichen resembling a drinking-glass. *c* is the reindeer moss, furnishing almost the sole food of that animal, so important to the Laplander. In the middle of Europe this lichen grows only to the hight of two or three inches; but in Lapland it sometimes attains to the hight of one or two feet. *Litmus*, which is so common as a chemical test for acids and alkalies, is obtained from a species of white lichen, called *archil;* this is also used for giving a crimson color to wool and silk. The powder called *cudbear*, used for dyeing purple, is obtained from a lichen.

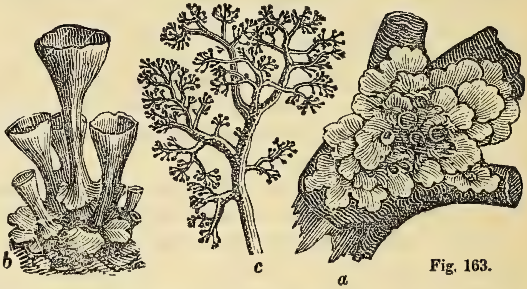

Fig. 163.

290. *Fungi*, the *sixth Order*, contains the *Mushrooms*, or fungus plants; these exhibit no appearance of green herbage; they are generally corky, fleshy, or mold-like. The fruit of some is external, of others internal. They are often of very quick growth and short duration. The genus *Agaricus*, which contains the common eatable mushroom, has a convex, scaly, white head, called a *pileus;* this is supported on a stalk called a *stipe.* On the under surface of the pileus, or cup, are seen many flesh-colored membranes called *gills;* these in the young state of the mushroom, are concealed by a wrapper called a *volva*, which is considered as a kind of calyx. As the mushroom becomes mature, the volva bursts and remains upon the stipe, while the pileus released from its confinement extends upward and exhibits an uneven appearance upon its edge, caused by its separation from the volva. Fig. 164 represents at *a* the *gills* running from the stipe to the circumference under the pileus; *b*, a young mushroom with the *pileus* of a globular form and not separated from the volva; *c*, the *volva*, or wrapper bursting and separating from the pileus so as to exhibit

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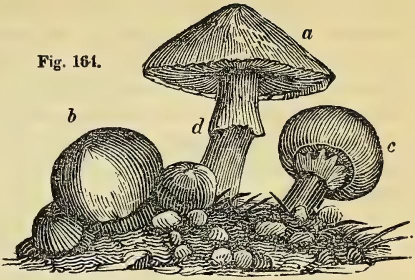
the gills beneath; *d*, part of the volva remaining upon the stipe in a circular form, and called an *annulus*, or ring. "If the mushroom," says Nuttall, "be left for a time on a plate of glass, a powder will be found deposited; this is the seed, or organic germ (*sporules*). That these are capable of germination is evident to cultivators, who now form mushroom-beds by strewing the decayed plants on prepared beds of manure." A species of the genus Agaricus is much valued for food. It is of a fine red or orange color; the ancient Romans esteemed it as a great luxury. The genus *Boletus* contains the *touch-wood*, or *spunk*, which is sometimes used as tinder. The Lycoperdon contains the puff-ball.

Fig. 164.



291. The Cryptogamous plants are less understood than most of the visible works of nature. Philosophers have asserted that some of this race do not belong to the vegetable but to the animal kingdom; having discovered insects in mushrooms, they say, like the sponge and the corals, these should be classed among animal productions. Few, however, at present entertain this belief; and the fact of their having been raised from seed (or bodies analogous to seeds) sprinkled on the earth proves them to be of vegetable growth. A curious field of inquiry presents itself in the consideration of the difference be tween animal and vegetable life.

292. From the obscurity in the structure of these plants the young pupil must expect to meet with difficulties in attempting to study them. It is well for mankind that there are philosophers whom the enthusiasm of scientific pursuits will lead to spend years, even a whole life, in searching into the fructification of a moss, or mushroom, or in examining into the natural history of a gnat or spider.* Discoveries are thus continually brought forward which add to the general stock of knowledge. It is a kind of martyrdom in the cause of science, to which a few seem to be called by the powerful impulses of their own minds.

293. We have completed our view of the vegetable world according to the order of the Linnæan classification; in the course of which we have remarked upon the most conspicuous genera, and traced their natural relations. In many cases, departing from the plan of general remarks, we have examined the natural history of some one genus. In reading history we are often less interested in the fate of a whole people than in

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* The late Professor Eaton once assured the Author that the study of *spiders* (*Arachnology*) was one of the most *elegant* and *delightful* of all pursuits.

Mushrooms capable of germination.—291. Cryptogamous plants little understood.—292. Enthusiasm of some naturalists.—293. View of classification completed—Remarks.

that of some prominent individual; the mind presented with general ideas only, has no means of forming images; it is in natural as in civil history,—general remarks upon the beauty and utility of the vegetable world, or the curious structure of plants, may make but slight impressions. But by contemplating the peculiarities of some one tribe, genus, or species, the mind seizes upon something definite; and reason, imagination, and feeling are easily awakened; thus the impression made is permanent. Of this tendency of the mind we should avail ourselves, by connecting *particular impressions with facts which lead to general principles.* Narrow indeed would be our mental vision, were it confined to single unconnected observations, laid up indiscriminately in the storehouse of thought; but our minds, not by our own will, but by a faculty received directly from our Creator, instinctively generalize and arrange their mass of single observations; and with scarcely an effort we perform that operation in the world of thought within us which the great Linnæus effected in the vegetable kingdom.

PART IV.

LECTURE XXXVIII.

THE FLOWERING SEASON OF PLANTS

Vernal and Summer Flowers.

294. HITHERTO we have been clearing our way through difficulties, and overcoming obstacles: first, we learned to analyze plants according to the rules of botanical science; next, to examine the organs of plants *anatomically* and *physiologically;* we then investigated the principles of classification as exhibited both in the natural and artificial systems. The language of Botany is now familiar to the diligent student who can enjoy the pleasant reflection that by his own industry and application he has elevated his mind to that state in which it may, with little further effort, enjoy the pleasant views of the vegetable kingdom which now present themselves. Thus the traveler having toiled to gain some acclivity looks complacently around, enjoying the beautiful view before him in proportion to the efforts made to attain it.

295. We will now suppose the dreary season of winter yielding to the gentle influences of spring, and organized nature awakening to new life and beauty;—for animals, no less than plants, seem vivified and quickened by the returning warmth of this delightful season. How many wandering through life, "with brute, unconscious gaze," have never made the inquiry, "*What causes Spring?*" With the greater part of mankind the ordinary phenomena of nature excite no interest; it is only when something *unexpected* occurs, that they think either of first or second

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294. What we have done.—295. What causes spring?

causes. But it should be the main object of education to teach youth to reflect, to seek the connection between cause and effect; and especially, to look through second causes to the Great Being who is the *First Cause* of all—"himself *uncaused.*" But to return to the question, "What causes Spring?" or, to state it in another form, By what means does the Almighty produce the changes which this season presents? To answer this, we must refer to *astronomical geography*, which, pointing out the course of the sun, shows us, that having journeyed to his utmost southern boundary, he returns, crosses the equator, and with rapid strides advances toward the northern hemisphere, beaming more directly upon us, and increasing the temperature of the atmosphere;—to *chemistry* we owe our knowledge of the effects of caloric on bodies;—*physiological botany* shows us the sap, or vegetable blood, expanding by the influence of caloric, and every exhaling and inhaling organ of the plant commencing operations under the same powerful influence. The earth, released from the icy bonds of frost turns kindly to the mute but living children of her bosom, and imparts the maternal nourishment, which, rushing through every fiber of the vegetable being invigorates it with health and strength.

296. From the first appearance of vegetation in the spring, until the commencement of winter, nature presents an ever-varying scene. The phenomenon of the *flowering* of plants is in many respects similar to that of the *putting forth of leaves*;* in both, the same causes either hasten or retard this period. The putting forth of leaves, and the blossoming of flowers, differ, however, in one circumstance: the leaves begin by the upper leaf-buds; the flowers generally by the lower flower-buds; *stipes*, *panicles*, and *thyrses*, begin to blossom gradually from the base to the summit; *cymes* and *umbels* blossom from the outside to the center.

297. In plants of the north transported to the south, the period of the putting forth of leaves and blossoming is hastened; in those of the south carried to the north, it is retarded. Even in their native soil this period varies in some degree in different seasons. With greater warmth of temperature, we have an earlier appearance of vegetation; yet in general this variation is so slight, that botanists are able by observation to fix with a sufficient degree of accuracy the time of the flowering of plants in particular latitudes and climates. The progress of vegetation varying little from latitude 40° to 43° north, the remarks we make on this subject may apply to that region of country extending from the mouth of the Hudson on the south, to the mouth of the Mohawk on the north; eastward to the Atlantic, and westward to the Pacific Ocean. In Ohio and the western part of New York, the climate on account of the influence of the lakes, and the cold eastern winds from the Atlantic being broken by ranges of mountains, is milder, and vegetation is somewhat earlier, than in New England in the same latitude.

298. In some cases a plant puts forth leaves and blossoms

* *Foliation.*

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296. Changes in vegetation—Putting forth of leaves and blossoming of flowers agree in some respects, differ in others.—297. Plants of the north transplanted to the south, and the reverse—Remarks on the progress of vegetation.

at the same time; but usually the leaves appear before the flowers, probably having a greater force to draw up the sap than the flowers, into which it rises by slow degrees. We see little appearance of vegetable life (except among the Cryptogamous plants and evergreens) as early as March;* sometimes snow covers the ground nearly or quite through the month: but if we examine the trees and shrubs, even then we may perceive by the swelling of their buds that they have already felt the vivifying influence of heat, and that a little increase of temperature will cause the embryo flower or leaf to burst its prison and come forth.

299. *Vernal Flowers.*—In April, the leaves of trees and shrubs begin to expand; a few flowers show themselves amid the damp, chilly atmosphere with which they are surrounded. Among the most interesting of these harbingers of spring is the HEPATICA *triloba*, or *liver-leaf;* a lowly, modest flower of a pale-blue color, with beautifully formed three-lobed leaves. The *low anemone* (ANEMONE *nemorosa*),† with its pale blossoms, is found in shady woods and damp pastures. The bright yellow flowers of the colt's-foot (*Tusilago*) brave the cold winds of early spring, while the reluctant leaves wait for warmer breezes. Most species of the *poplar* are now in blossom; also the Salix, or *willow;* this genus includes the *weeping-willow*, or SALIX *tristis*,‡ sometimes called Salix Babylonica; it is alluded to in a beautiful passage in the Psalms which represents the children of Israel, when in captivity, as sitting down by the waters of Babylon to weep, and hanging their harps on

> "Willow-trees that withered there."

Among the forest-trees now in blossom are the *maple* and *elm.* In the meadows and moist grounds is the *American cowslip* (CALTHA *palustris*), a fine example of the class Polyandria; and the *adder's-tongue* (ERYTHRONIUM) having a beautiful liliaceous flower. In woods and by the sides of brooks is to be seen the Sanguinaria, or *blood-root*, which bears a white blossom more elegant and ornamental for a garden than many flowers which are brought from foreign countries, and affording from its root a highly valuable medicine. The CLAYTONIA, or *spring beauty* is also to be found at this season; the *dandelion*

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* Reference is made here to the region about Troy, New York, where the first edition of this work was prepared for publication in the year 1829. In the region near Baltimore, in Maryland, lat. 39°, the author finds vegetation about a month earlier; thus the remarks made respecting vegetable life in March, may for the latitude of Baltimore be referred to February, and so on through the blossoming of plants in the other months.

† This little flower may be seen raising its head amid surrounding snows on the banks of the Poestenkill, a streamlet which flows into the Hudson, near Troy.

‡ *Tristis* (Latin) signifies pensive, or sad.

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296. Why do the leaves usually appear before the flowers?—Vegetation in March.—299. Vernal Flowers.

is among the earliest flowers of spring. The *garden violet* appears in bloom; the VIOLA *rotundifolia*, or *yellow violet*, with leaves lying close to the ground, is found in the meadows. Several species of Carex are now in blossom; the *trailing arbutus* (EPIGEA *repens*) and the TRILLIUM decorate the woods.

300. In May many species of the *Viola* appear; as there is sometimes a difficulty in determining between these species, the study of the *natural characters* is the more important; if the student cannot fully determine the species of a plant, it is much to know its genus and natural family; the *Violaceæ* can scarcely be mistaken. One of the most *interesting* flowers of this season found in woods and meadows, is the ANEMONE *Virginiana*, the *wind-flower*, a name given as some say because the flower expands only in windy weather; but as another reason might be given, its very caducous petals which are swept away by the lightest zephyr; the petals are large and white, the stem grows to the hight of two or three feet, and contains one terminal flower. Several other species of the Anemone are in blossom about this time.

The *Xylosteum*, or *fly-honeysuckle* may be found by the side of brooks; this is a shrub with blossoms growing in pairs; the UVULARIA, a plant of the lily family having a yellow blossom, grows in the woods; the *strawberry* is now found, with its numerous stamens growing on the calyx; it has also many styles, each one bearing a seed. The ARONIA is an early flower; a species of this, the *shad-blossom*, is not unfrequently found in April; this is a large shrub, often growing upon the banks of brooks, with white petals clustering together in the form of a raceme. Many of the *mosses* are now in blossom; these are interesting subjects of study, though their structure is not so well understood as that of the phonogamous plants. It may surprise the beginner in Botany to learn that *mosses have blossoms;* science teaches us that every plant has its own perfection, is good after its kind, and "its seed is in itself." The ARUM, or *wild turnip*, is now found in shady places; the root is valuable in medicine. The CALLA *palustris*, or *water arum*, abounds in wet grounds. The AQUILEGIA, or *wild columbine*, with its horned nectaries, is found hanging in rich clusters from the clefts of rocks. Among the early garden flowers are the *snow-drop*, *crocus*, *crown-imperial*, *violet*, *primula*, *polyanthus*, *daffodil*, *narcissus*, &c.

301. *Flowers of Summer.*—The plants which are now in blossom are very numerous; we will mention a few of the most common and interesting. A well-known shrub, the *elder* (SAM-

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300. Flowers of May—Viola—Anemone, &c.—Mosses now in bloom—Wild turnip, &c.—301 Flowers of Summer.

bucus), is now found along the sides of hedges, or on the margin of brooks, and in the meadows; the Rubus, or *raspberry*, the Ranunculus, or *butter-cup*, the Cynoglossum, or *hound's-tongue*, and the Trifolium, or *clover*. It is recorded in history, that when St. Patrick went as a missionary to preach the Gospel to the then pagan Irish, "he illustrated the doctrine of the Trinity by showing them a trifolium, or three-leaved grass with one stalk; this operating to their conviction, the Shamrock, which is a bundle of this grass, was ever afterward worn upon this saint's anniversary to commemorate this event." In the meadows is seen at this time the Geranium *maculatum*, a showy flower, and almost the only *American geranium;* in the woods, the splendid *ladies'-slipper* (Cypripedium), and the *wild-mandrake* (Podophyllum), a flower of curious appearance. The genus Convallaria, of which the *Solomon's-seal* is an example, may now be found; it is usually white, with a funnel-form corolla. Some other species, as the *lily-of-the-valley*, have a bell-form corolla. The various species of Vaccinium, of which the *whortleberry* is an example, are now in blossom; the woods are ornamented by the snowy-white Cornus, or *dog-wood* flowers.

302. In the early part of June the foliage of the trees usually appears in perfection; among the earliest are the *willow*, *poplar*, and *alder;* next are the *bass-wood*, *horse-chestnut*, *oak*, *beech*, *ash*, *walnut*, and *mulberry*, which are not all usually in full leaf before the middle of June. At the summer solstice a new race of blossoms appears—the *roses*, *pinks*, and *lilies*, with many other exotics. The Iris is found in stagnant waters and in gardens. Among native plants we now find the Asclepias, or *milk-weed*, of which there are some very showy, and some delicate species. The little *bell-flower* (Campanula) may be seen nodding over the brows of the rocks. The brilliant *laurel* (Kalmia) is now in bloom. The climbing *virgin's-bower* (Clematis) hangs in graceful clusters of white flowers from the boughs of shrubs and trees, growing by the side of brooks. The curious *side-saddle flower* (Sarracenia) is now to be found in swamps and wet grounds. The *mullein*, with its long yellow spike, is very conspicuous in old fields and by the road-side.

More flowers are in blossom about the time of the summer soltice than during any period of the year, until the blossoming of the autumnal plants. The hot breath of summer withers the expanding flowers, the earlier ones fade away, and the late ones do not immediately come forward;—it would seem as if the earth, having poured forth in rapid succession innumerable treasures, now required a suspension of her efforts; but, with

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Elder, &c.—St. Patrick's use of the clover.—Geranium, &c.—Convallaria.—302. Trees—Blossoms appearing at the summer solstice.—What effect does the heat of summer have upon flowers?

recovered energy she soon begins to spread forth new beauties, and to deck herself in her most gorgeous attire.

303. The *autumnal flowers* differ in appearance from those which we find in the earliest part of the season. Few examples of the *Compositæ* occur until the latter part of July and beginning of August. There is little difficulty in learning to distinguish the different genera of this vast natural order, as an *Aster*, a *Solidago*, or a *Helianthus*. These genera contain numerous species not always clearly defined. The student will learn that there is some confusion among botanical writers, and must acquire independence of opinion by close research into the book of nature, which contains no errors. Among the fine flowers which autumn presents are the scarlet LOBELIA, or *cardinal flower;* the yellow GERARDIA (*false fox-glove*), and the *sun-flower* (*Helianthus*). The LINNÆA *borealis* is found in September; at this time the *white pond-lily* (NYMPHÆA), one of the most splendid of American flowers is seen whitening the surface of the lakes and ponds, sometimes alternating with the *yellow water-lily* (NUPHAR), a flower of less striking elegance than the former, but not less curious in its form. Another aquatic plant, which, although it blossoms in summer continues in flower until late in the autumn, is the SAGITTARIA, or *arrow-head*, with a calyx of three sepals, and three white petals. The *Eupatorium*, or *thorough-wort*, which blossoms in autumn has no external beauty to recommend it, but as a remedy in diseases, perhaps no plant is more useful. Among the exotics which grace the decline of the year, are the splendid *dahlias*. The gay *chrysanthemums* blossom only on the verge of winter, but they require protection from frosts. We see among the last blossoms of the season, the *aster*, and some other kindred flowers; these seem for a time to endure the autumnal blasts, but they gradually give way to the reign of winter; while the desolate fields and meadows present but a gloomy contrast to their once verdant and glowing appearance.*

304. *Evergreens.*—During the season of winter in our climate, few flowers appear, except on such plants as are shielded from the inclemency of the weather; even the green-house plants can scarcely be made to blossom. The leaves of deciduous trees, and the stems of all annual plants are dead; some hardy evergreens retain their cheerful verdure. At Christmas, the foliage of the *laurel*, *pine*, *spruce*, and the beautiful *running* or *ground-pine* (LYCOPODIUM), belonging to the family of Ferns,

* At an elevation of several hundred feet above the water level, in latitude 39°, at the Patapsco Institute, near Baltimore, Chinese roses have continued to blossom in the open air as late as the first of December

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303. Autumnal flowers.—Which is most difficult to ascertain, the *genus* or *species* ?—Lobelia. Gerardia &c.—304. Vegetation in winter.

are found in perfection, ready to welcome the anniversary of our Saviour's birth.

a. The custom of decorating churches with evergreens is of very ancient date. On this subject an English writer observes: "The evergreens, with which the churches are usually ornamented at Christmas, are a proper emblem of that time when, as God says by the prophet Isaiah, *I will plant in the wilderness the cedar and the myrtle, and the olive-tree ; I will set in the desert the fir-tree, and pine tree, and the box-tree together.*" And in another place, "*The glory of Lebanon shall come unto thee ; the fir-tree and the pine-tree, and box together, to beautify the place of my sanctuary ; and I will make the place of my feet glorious.*" In the Romish Church it is customary to bear palm boughs in procession, on the anniversary of the day called *Palm-Sunday*, when Christ went into Jerusalem and the children strewed branches of palm-trees before him. In more northern latitudes, box, pine, olive, and willows are used as a substitute for palms, which do not grow, as in Judea, by the way-sides. The day on which this ceremony is performed is called Palm-Sunday.

305. *Superstitions with regard to the blossoming of Plants.*—In Italy, the *dead-nettle* being in blossom about the day of St. Vincent, a martyr who suffered for Christianity under the Emperor Dioclesian in the year 304, the flower is consecrated to him. The *winter hellebore*, in blossom about the time of the conversion of St. Paul, was supposed to commemorate that event. The *crocus* was dedicated to St. Valentine, as it appears about the period of that saint's day, which is regarded as peculiarly sacred to affection. One species of *daisy* appears about the time of St. Margaret's day; this is called in France, La Belle Marguerite, and in England, Herb-Margaret. The *crown-imperial* blossoms in England about the eighteenth of March, the day of St. Edward, King of the West Saxons; nature thus, as was imagined, honoring the day with a royal flower. The cardamine, or *Our Lady's flower*, distinguished for its pure white, is dedicated to the Virgin Mary. The marygold, so called from a fancied resemblance of the florets of its disk to rays of glory, is also consecrated to the Virgin. On the day of St. George, the patron saint of England, the *blue-bells*, there called *field hyacinth*, tinge the meadows and pastures with their deep blue color; they were thought to afford an emblem of the empire of the ocean over which England assumes the rule.

a. The St. John's-wort blossoms near that saint's day. The scarlet lychnis, called the great candlestick (CANDELABRUM *ingens*), was supposed to be lighted up for St. John the Baptist who "was a burning and a shining light." The *white lily* expands about the time of the *Annunciation*, affording another coincidence of the blossoming of white flowers at the festivals consecrated to the mother of Christ. The roses of summer are said to fade about the period of St. Mary Magdalen's day. The *passion-flower* is said to blossom about Holy-rood or Holy-cross day; according to superstitious legends, the cross on which our Saviour was crucified was discovered in the year 326, by Helena, the mother of Constantine, who is said to have built a church on the spot where it lay. The word *Rood* signifies the Cross; thus this day is the day of the Holy Cross. It was during the middle ages, when the minds of men were influenced by the blindest superstition, that they thus imagined every operation of nature to be emblematical of something connected with their religious faith. Although these superstitions are trifling and absurd, they are interesting as connected with the annals of the human mind, and as showing us the origin of many names of plants. Had the authors of these conceits, who were at that time the most learned part of the community, been possessed of as much knowledge as most children in our day, they would have reflected that plants bloom earlier or later, according to climate; and that a flower which in Italy blossoms as early as February, might not appear in England before April; while the *day of the saint* which the flower was supposed to commemorate, would occur at the same time in both places.

306. *Phenomena of Plants, arising from changes in the atmosphere.*—Plants ex-

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a. **Decorating churches with evergreens—Palm-Sunday.—305. Superstitions with regard to the blossoming of certain plants—Plants dedicated to Saints.—*a.* St. John's-wort, &c.—Holy Rood day.**

hibit some phenomena which are supposed to arise from the state of the atmosphere accurate observers of nature have made remarks upon these changes, as prognosticating certain changes of weather. Lord Bacon, who was remarkably attentive to all the appearances and changes of natural objects, is the author of the following observations: "*Chickweed* (*Anagallis*).—When the flower expands boldly and fully, no rain will happen for four hours or upward: if it continues in that open state, no rain will disturb the summer's day; when it half conceals its miniature flower the day is generally showery; but if it entirely shuts up or veils the white flower with its green mantle, let the traveler put on his great-coat, and the plowman, with his beast of draught, expect rest from their labor. *Siberian Sow-thistle* (*Sonchus*).—If the flowers of this plant keep open all night, rain will certainly fall the next day. *Trefoil* (*Hedysarum*).—The different species of trefoil always contract their leaves at the approach of a storm; hence these plants have been termed the husbandman's barometer. *African Marygold.*—If this plant opens not its flowers in the morning about seven o'clock, you may be sure it will rain that day, unless it thunders. *White thorns* and *dog-rose bushes.*—Wet summers are generally attended with an uncommon quantity of seed on these shrubs and their unusual fruitfulness is a sign of severe winter." Besides the above there are several plants, especially those with compound yellow flowers which during the whole day *turn their flowers toward the sun*, viz., to the east in the morning, to the south at noon, and to the west toward evening. This is very observable in the sow-thistle, *Sonchus arvensis;* and it is a well-known fact that a great part of the plants in a serene sky expand their flowers, and as it were, with cheerful looks behold the light of the sun; but before rain they shut them up, as the tulip. The flowers of the chick-wintergreen (*Trientalis*) droop in the night, lest rain or moisture should injure the fertilizing pollen. One species of *wood-sorrel* shuts up or doubles its leaves before storms and tempests, but in a serene sky expands or unfolds them, so that husbandmen can foretell tempests from it. It is also well known that the sensitive-plants observe the same rule.

307. Besides affording prognostics of weather, many plants fold themselves up at particular hours, with such regularity as to have acquired names from this property. The following are among the more remarkable plants of this description. *Goat's-beard.*—The flowers of two species of *Tragopogon* open in the morning at the approach of the sun, and without regard to the state of the weather, regularly shut about noon. Hence it is generally known by the name of *go-to-bed-at-noon.* The *four-o'clock* (*Mirabilis*), sometimes called princess' leaf, is an elegant shrub in its native clime, the Malay Islands. It opens its flowers at four in the evening, and does not close them till the same hour in the morning. It is said people transplant this plant from the woods into their gardens, and use it as a dial or clock, especially in cloudy weather. The *Evening Primrose* (*Œnothera*) is well known from its remarkable property of regularity, shutting with a loud popping noise about sunrise, and opening at sunset. After six o'clock these flowers regularly report the approach of night. The *Tamarind-tree*, the water-lily (*Nymphœa*), the marygold, the false sensitive-plant, and several others of the Diadelphia class, in serene weather expand their leaves in the daytime, and contract them during the night. According to some botanists, the tamarind-tree infolds within its leaves the flowers or fruit every night, in order to guard them from the cold or rain. The flower of the garden lettuce opens at seven o'clock, and shuts at ten. A species of *aloes*, whose large and beautiful flower exhales a strong odor of the Vanilla during the time of its expansion which is very short, is cultivated in the imperial garden of Paris. It does not blossom until toward the month of July, and about five o'clock in the evening, at which time it gradually opens its petals, expands them, droops and dies. The *Cereus grandiflorus* exhibits an exquisitely beautiful flower, and emits a highly fragrant odor for a few hours in the night, and then closes, to expand no more. The flower is nearly a foot in diameter, the inside of the calyx of a splendid yellow, and the numerous petals are of a pure white. Several species of the Cereus are nocturnal flowers. The flower of the *dandelion*

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306. Lord Bacon's observations—Plants which turn toward the sun.—**307.** Plants which hang **their** heads at night and in storms—The go-to-bed-at-noon—The four-o'clock—Evening primrose—**Tamarind-tree, &c.**—Aloes—Night-blooming Cereus, &c.

possesses a very peculiar means of sheltering itself from the heat of the sun, as it closes entirely whenever the heat becomes excessive.

308. Linnæus divided flowers, in reference to their sensibility to atmospheric changes, into three classes:

1. *Meteoric flowers*, which less accurately observe the hour of folding, but are expanded sooner or later, according to the cloudiness, moisture, or pressure of the atmosphere.
2. *Tropical flowers*, that open in the morning, and close before evening every day; but the hour of their expanding becomes earlier or later, as the length of the day increases or decreases.
3. *Equinoctial flowers*, which open at a certain and exact hour of the day, and for the most part close at another determinate hour.

LECTURE XXXIX.

HABITS OF PLANTS.—AGENTS WHICH AFFECT THEIR GROWTH.—THEIR HABITATIONS, AND GEOGRAPHICAL SITUATIONS.—ELEVATION CORRESPONDING TO LATITUDE.

309. The constitution of plants and animals seems to fit them for particular climates, and for digesting food of a certain kind. The plant cannot, like the animal, rove about in search of food best suited to its nature, but, fixed in one spot, must receive the nourishment that there offers itself. If this nourishment be too abundant, the vessels loaded with excess cease to perform their accustomed functions, and the plant dies of *surfeit;* if, on the other hand, the food offered be too little, or not sufficiently nourishing, the plant dies of *starvation.*

a. Yet plants may be brought to live in climates, and on food not naturally suited to their constitutions; or in other words, their *habits* of life may be changed. Although we may suppose that many things now necessary to our comfort, and even our lives, are rendered so by nature; yet if we reflect a moment, we shall see that many of our own wants are the result of habit. The children of poor parents run about in the snow with bare feet, and are apparently much more vigorous than the little master and miss whom the winds of heaven are not permitted to visit. Why does this difference exist between individuals of the same species? It is owing to *habit.* Thus, we may see lingering upon the verge of a northern winter a nasturtion; but the same temperature which it bears without injury. would at once destroy those of the same species which have only lived beneath a tropical sun.

310. In changing the habit of a plant, or, as it is frequently termed, *naturalizing* it, the *temperature* is the principal thing

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306. Linnæus' division.—309. Plants fitted for particular climates—*a.* Remarks on their habits of life.—310. Temperature considered in the naturalization of plants.

to be considered; although the *soil* and the *quantity of moisture* should be rendered as similar as possible to those of its native habitation. Plants from warm climates are gradually accustomed to a lower temperature by placing them in hot-houses, then in green-houses, and lastly, in the open air. Plants vary in their susceptibility of naturalization. The *horse-chestnut*, which is now common in the Middle and Northern United States, was originally brought from the tropical regions. In these regions, however, it usually grows in grounds somewhat above the level of the sea, and therefore its habit, as to temperature, renders it in some degree fitted for more northern countries. *Orange* and *lemon trees* cannot be brought to bear the roughness of our climate without some protection. In many cases, *perennial plants by this change of climate are converted into annual ones;* as if fearing the inclemencies of a cold winter, they pass through their successive stages of existence with rapidity, and accomplish in one summer what they had been accustomed to require years to perform. The *nasturtion* was originally a perennial shrub, flourishing without cultivation on the banks of the Peruvian streams; yet, transferred to this country, it is an annual herbaceous plant, which completes its term of existence in a few months.

311. The *acclimating* of some plants is with difficulty accomplished; others change their habits more readily, as *Indian corn*, which, aided by climate and culture, suffers a remarkable change. After having been for several years raised in Canada, it arrives to perfection in a few weeks, and on that account is employed in New England for *early* corn; but that which has been for years cultivated in Virginia will not ripen in a New England summer; yet originally, the early corn of Canada and that of Virginia were the same, both in habit and other properties. While merely ornamental or curious plants can with difficulty be made to vegetate freely in foreign situations, the vegetables most useful to man are disseminated and cultivated. The delicate exotic flowers often disappoint our expectations; but the wheat, the potato, and corn, which are also exotics, seldom withhold their fruits from the labor of the husbandman. Thus should earthly parents, imitating their "Father in heaven," first provide their children with what is *useful* both for body and mind, leaving the *ornamental* to be bestowed or not, as circumstances may render proper.

312. *Agents which affect the Growth of Plants.*—Of the various substances by which vegetables are nourished, *water* seems the most important. Some plants grow and mature with their roots immersed in water, without any soil; most of the marine

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Plants, as to naturalization.—311. Indian-corn—Useful vegetables easily cultivated.—**312. Agents that affect the growth of plants—Water.**

plants are of this description. *Atmospheric air* is necessary to the health and vigor of plants; if a plant is placed under a glass into which no air can enter it withers and dies. Most plants contain a certain portion of *salts* absorbed from the soil by which it is nourished. No plants can grow without some degree of *heat*, though some require a greater portion of it than others. Plants may be made to grow without *light*, but they will not exhibit the verdure, or any of the properties of health. The *atmosphere which is contaminated by the respiration of animals is restored to purity by the vegetation of plants;* thus animals and plants depend on each other for existence. Secluded from light, vegetables are no longer capable of converting a portion of the fixed air to their use, or of supplying the atmosphere with the oxygen on which its importance in supporting animal life chiefly depends. *By the action of light, the carbon of the fixed air* (carbonic acid gas) *is interwoven with the texture of plants.* The aromatic plants, as the clove, cinnamon, and Peruvian bark, all owe their chief excellences to the intense light of the equatorial regions. *Gases* of different kinds affect vegetation very differently. *Carbonic* acid gas, though prejudicial to the germination of the seed, has been found when properly applied to hasten the process of vegetation in the plant. Undiluted, or pure carbonic acid gas, destroys vegetable life; thus, a growing plant placed over wort in a state of fermentation dies in a few hours. Dr. Priestley, a celebrated chemist, proved that this gas is of great utility to the growth of plants vegetating in the sun, and that whatever promotes the increase of it in their atmosphere, at least within a certain degree, assists vegetation. In the shade an excess of carbonic acid gas is found to be hurtful to plants. *Oxygen* gas is essential to the germination of the seed, and to the growth of the plant. Flower-buds confined in an atmosphere deprived of oxygen fade without expanding. Neither *Nitrogen* nor *Hydrogen*, when unmixed with other substances, afford an atmosphere favorable to vegetation.

313. *Habitation of Plants.*—Vegetation is not scattered by chance over the surface of the globe, but we perceive that the Creator has regulated its distribution according to certain fixed principles; we find not only a wonderful adaptation of plants to the physical necessities of animals in general, but that they are also varied to correspond to the peculiar wants of animals in different climates. First, we would notice the *herbs* which cover the surface of the earth;—had their stems been hard and woody, the greater part of the earth would have been inaccessible to the foot of man until the vegetation was first destroyed

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Atmospheric air—Salts—Heat—Light—Gases.—313. Habitation of Plants—Herbs.

by fire, or by some other means. Can we imagine that the grass and herbs which now afford a soft carpet for our feet came *by chance* to grow thus, rather than hard and woody like the trees? That *by chance* the prevailing color of vegetation is *green*, the color upon which the eye rests with the most agreeable sensations? Had the prevailing hue of vegetation been red or yellow, with our present organs of sight how painful would be the sensations excited by these bright colors! Instead of beholding the face of nature with delight, we should turn from it, and vainly seek some object on which the eye might repose. *Woody shrubs* occasionally alternate with herbs, but they are so placed as not to offer obstructions to the foot of man; they often grow out of the clefts of rocks, affording a means of climbing almost perpendicular precipices. *Large trees* are not usually placed so near each other as to prevent a passage between them; their lowest branches are mostly at a hight sufficient to admit men and beasts under them, and thus few forests are impenetrable.

314. In *cold countries*, whether occasioned by distance from the equator or elevation by means of mountains and table-lands, we find the *pine*, *fir*, *cedar* and other resinous plants which furnish man with light and fuel during the dreary season of winter. The leaves of these trees are mostly filiform, or long and narrow, thus fitted for reverberating the heat like the hair of animals, and for resisting the impetuosity of winds which often prevail in those regions. In *warm countries trees present in their foliage a resource from the scorching rays of the sun;* their leaves serve as fans and umbrellas. The leaf of the *banana* being broad and long like an apron, it has acquired the name of Adam's fig-leaf. The leaves of the cocoa-tree are said to be from twelve to fifteen feet long, and from seven to eight broad. A traveler remarks, that one leaf of the *talipot-tree* is capable of covering from fifteen to twenty persons. The soldiers, he says, use it for a covering to their tents. He observes that it seems an inestimable blessing of Providence, in a country burnt up by the sun, and inundated by rains for six months of the year. In our climate during the warm season, Providence bestows upon us a variety of juicy and acid fruits, cherries, peaches, plums, melons, and berries;—nuts and many fruits are fitted for preservation during the winter, so that we are never destitute of some of these bounties.

315. A remarkable instance of the care of Providence in providing for the wants of man, appears in what is related of the *Nepenthes* distillatoria, found amidst the burning deserts of Africa; the leaf of which is in the form of a pitcher, and the plant possesses the property of secreting moisture to such a degree, as to form a

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Woody shrubs—Trees.—314. Trees of cold countries—Trees of warm countries—Fruits of our climate.—315. A plant found in the deserts of Africa.

quantity of water sufficient for a draught to a thirsty person; the end of the leaf forms a lid, as if to prevent the evaporation of the fluid. Various other plants in hot regions, furnish refreshing draughts or cooling fruits for the thirsty traveler These remarks might be pursued to an extent as great as the vastness of the vegetable kingdom and the wants of man; we have merely glanced at the subject of the adaptation of plants to the wants of animal life, hoping that these few suggestions may lead the student to trace, from observation of the works of nature, the operations of that *great designing Mind* which rules and governs all with infinite wisdom and benevolence.

316. We find the earth to be covered with a multitude of species of plants, differing not more by their external forms than by their internal structure, and each endowed with peculiar habits and instincts. Some species seem adapted to the mountains, some to the valleys, and others to the plains; some require an *argillaceous* or *clayey* soil; others a *calcareous* soil, or one impregnated with *lime;* others a *quartzose* or *sandy* soil; and some will only grow where the earth contains soda or marine salts. Many plants will grow only in water; we find here such as are peculiar to the marsh, the lake, the river, and the sea. Many plants require a very elevated temperature; some will grow only in mild and temperate climates, and others only in the midst of frost and snows. Thus every country where man is to be found has its vegetation.

317. Some species, with respect to *localities* are confined to narrow limits. A species of ORIGANUM (the *Tournefortii*) was discovered by Tournefort, in 1700, upon one single rock in the little island of Amorgos, in the Greek Archipelago; eighty years afterward the plant was found in the same island, and upon the same rock, and has never been discovered in any other situation. *Some plants confine themselves within certain longitudes*, scarcely varying to the right or left. The MENZIESIA *pallifolia*, a species of heath, confined between ten and fifteen degrees of west longitude, is found in Portugal, Spain, and Ireland. *Latitude* and *elevation*, bv reason of mountains and table-lands, produce a greater variety in the appearance of vegetation than almost any other causes. *Few plants are found to endure extreme cold.* Botanists formerly estimated, that at Spitsbergen, in north latitude 80°, there were but about thirty species of phenogamous plants; in Lapland, 70° north latitude, five hundred and thirty-nine species; at Madagascar at the tropic of Capricorn, five thousand; and at the equator a much greater number. These estimates fall very far short of the number of species now known, but they may give some idea of the difference in the vegetation of cold and warm climates.

318. *Geographical Situation of Plants.*—Every country exhibits a botanical character peculiar to itself. Linnæus, in his

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Reflection. –316. Plants adapted to various soils, &c.—317. Locality—Extreme cold –318. Every country has its own botanical character.

bold and graphic language, said,* "A practical botanist can usually at the first glance distinguish the plants of Africa, Asia, America, and the Alps; but it is not easy to tell how he is able to do this. There is a certain character of sullenness, gloom, and obscurity in the plants of Africa; something lofty and elevated in those of Asia; sweet and smiling in those of America; while those of the Alps seem rigid and stinted." In investigating the geographical situation of the vegetable kingdom we see the powerful *effects* of *light and heat.* Feeble in the *polar regions*, vegetation acquires strength as we approach *toward the equator*, where the light of the sun is vivid, and its heat permanent and intense. At the *termination of the land at the Arctic Ocean* there is one long, cold night, and one day of warmth, in which vegetation is rapidly brought forward; plants in some cases germinate, blossom, perfect their seed, and die within six weeks. Within the limit of perpetual snow the arctic sailors have found large patches of the *Palmella nivalli*, red snow (of the algæ tribe), the simplest of all the vegetable race; the plant consists but of *one cell*, containing a fluid. On the Alps and Pyrenees it is found reddening the surface of the snow, from which it derives its support. A species of *lichen* (the Gyrophora) was found, and used for food by Sir John Franklin, within the arctic circle. After passing from the arctic circle to the borders of the temperate zone, we find a few species of plants, chiefly *lichens*, *mosses*, and *ferns*, also a few *shrubs* and *berries*. Lapland is the only country within this zone where any kind of grain can be raised. In those *frozen climates* plants are low and stinted which in other situations rise to a great hight. The *beech* and *willow*, the giants of those regions, rise but a few inches above the surface of the ground, while their stems lie hidden among the moss, as if wanting strength to penetrate the soil.

319. Humboldt divided the *temperate zone*, with respect to productions, into three regions: the *cold*, the *temperate*, and *warm;* in the cold region *grain* may be raised to advantage, and *berries* grow in abundance. In the temperate region the *wine-grape*, *grain*, and fruits of many kinds are cultivated in their greatest perfection. The warm region produces *olives*, *figs*, *oranges*, and *lemons*. The variety of plants in the *torrid zone* is very great; trees are more numerous in proportion to other plants than in the temperate zones; the same tribes which are there slender and humble plants, here spread into lofty trees many of which are adorned with large and beauti-

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* 'Primo intuitu distinguit sæpius exercitatus botanicus plantas Africæ, Asiæ, America, Alpiumque, sed non facile dicerit ipse ex qua nota. Nescis quæ facies torva, sicca, obscuris Afris; quae superba exaltata Asiaticis; quæ læta, glabra Americanis; quæ coarctata, indura Alpinis.'

Plants of the frigid zone.—319. Temperate zone—Torrid zone.

ful flowers. The richest fruits and spices and the most valuable medicinal plants, are found here. In ascending the mountains of the torrid zone, as the temperature varies, each section has its own distinct plants; and we find in succession the production of every region from the equator to the poles.

320. The productions of the *southern temperate zone* differ much from those of the northern temperate, owing to many causes, which impede the dissemination of plants, variations in temperature from elevation, &c. The antartic flora terminates at Terra del Fuego and Kerguelen's land;—while in the arctic regions no land has yet been discovered entirely destitute of vegetation, in the antarctic utter desolation prevails, not even a lichen clings to the frost-covered rocks. Perpetual snow comes to a lower latitude in the southern frigid than the northern frigid zone. Cockburn Island, one of the South Shetland group, in south latitude 60°, contains the last vestiges of vegetation; while in the same degree of latitude in North America, lands are inhabited and cultivated.

321. As the *mountains of the torrid zone* afford every variety of climate between their base and their summit, so they are capable of producing all the vegetables of every climate;—but, as latitude increases, temperature diminishes, so, generally speaking, the productions, as we proceed from the tropic northward or southward, correspond with the elevation at which the same plants will grow upon a mountain within the tropics. Every plant requires, other circumstances being the same, the same *mean annual temperature*;* for example: the plantain-tree and sugar-cane require a mean annual heat of from eighty-two to eighty-three degrees of Fahrenheit; but seventy degrees of mean annual heat is not found beyond the twenty-seventh degree of latitude; consequently, the plantain and sugar-cane will not ripen in the open air in a higher latitude; and this Baron Humboldt has found to correspond with the hight of three thousand feet under the equator. Cotton will not flourish without sixty-eight degrees of heat; this is not found beyond thirty-four degrees of latitude, which corresponds with about three thousand six hundred feet of elevation at the equator. The same reasoning applies to all other plants, with the exceptions arising from warm valleys, moisture of air, and richness of soil.

	Feet above the level of the sea.
The highest spot on which man ever trod....................	19,400
The highest limit of the lichen plant...........................	18,225
The lowest limit of perpetual snow under the equator...	15,730

* For explanation of mean annual temperature, see note, page 142.

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320. Southern temperate zone.—321. Production of every region found in ascending mountains of the torrid zone—Elevation produces similar effects on vegetation, as distance from the equator

	Feet above the level of the sea.
The highest limit of pines under the equator	12,801
The highest limit of trees under the equator	11,125
The highest limit of oaks under the equator	10,500
The highest limit of the Peruvian bark tree	9,500
The lowest limit of pines under the equator	5,685
The highest limit of palms and bananas	3,280

LECTURE XL.

PLANTS AS AFFECTED BY CULTIVATION.—CHANGE OF THE ORGANS.—DISEASES.—ECONOMICAL USES.

322. It has been remarked, that though *species* may in some respects be *varied* by cultivation, yet their distinctive characters will not be wholly lost. The differences which exist in species are expressed by the terms *races*, *varieties*, and *variations*. *Races* are those differences in a species which are of a striking kind, and continued from the parent to its offspring by being propagated by the seed. They are produced by strewing pollen of one species upon the pistils of another; the seed thus formed will produce a plant resembling both. *Varieties* are a less important distinction than races; they are not continued by means of the seed, but produced by grafting or continuation of the plant under some new circumstances. *Variations* denote the slightest kinds of difference; they are occasioned by peculiarities of climate, soil, moisture, dryness, &c.

323. *Metamorphosis, or change of the organs of plants.*—The organs of plants, owing to peculiar causes, often experience a *metamorphosis*, and instead of their usual or normal appearance, exhibit anomalies, or vegetable deformities. We here use the term deformity, as signifying any variation from the ordinary course of nature. The causes which produce these changes are:

1st. The *adhesion of parts* usually separate; thus we often see flowers, leaves, and fruits united, and appearing double.

It was asserted by De Candolle, many years since, that a single petal which forms the corolla of many flowers, as the stramonium or the blue-bell, is in reality composed of several petals which become soldered, or cohere together before the flower expands. The same botanist considered a monosepalous calyx to be composed of several little leaves thus united before their development.

2d. *Changes are occasioned by a want of sufficient vigor in the plant to bring all parts to maturity.* Some seeds thus often

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322. Permanence of species—Races—Varieties—Variations.—323. Metamorphosis of the organs of plants—Adhesion.

fail or become abortive for want of nourishment; many plants which in one flower produce several seeds, often ripen no more than one. The horse-chestnut has six seeds, but seldom matures more than two; in the *blossom of the oak* where six seeds are produced, but *one acorn* is perfected.

3d. In some cases *organs appear from certain changes to be incapable of performing their original offices*, and thus exhibit deformities; as where a bud which for want of sufficient nourishment, or some other cause, does not develop itself into a leaf but forms a permanent protuberance or swelling upon the stem. The prickly-pear exhibits a thick and expanded stem, which is formed of leaves imperfectly developed.

4th. The *stamens and pistils, through excess of nourishment, swell and become petals;* all double flowers are formed in this manner. The poppy in its natural state has many stamens, and but four petals; but we often see double poppies, with scarcely the vestige of a stamen left; the same change may be observed in the rose, which naturally has but five petals and many stamens and pistils, but in a very full double-rose scarcely any appearance of either stamen or pistil is to be seen. The stamens, more frequently than the pistils, meet with this metamorphosis, as they appear to be more intimately connected with the petals.

5th. The *petioles*, or *foot-stalks*, often *change to leaves.* This may be seen in an Arabian plant, Acacia *nilotica*, which furnishes the gum-arabic. This tree at first exhibits upon one petiole six or eight pair of leaves; this number every year becomes less, until all the leaves disappear; the petiole then retaining all the nourishment which before was distributed to the leaves, flattens and expands, and appears in the form of a thick leaf.

6th. The *peduncles* and *petioles sometimes change into tendrils*, as in the vine; this plant at first throws out many large leaves and clusters of flowers; but the food not being sufficient to support such a profuse vegetation, the new leaves and clusters of flowers appear smaller; the nourishment becoming still more scanty, at length neither flower nor leaf is developed, and the peduncle and petiole become tendrils which by attaching themselves to some firm bodies serve to sustain the rich fruit which is perfected on the lower parts of the branch.

7th. *Buds are transformed into thorns.*—When a plant forms more buds than it can nourish, some of them do not develop branches and leaves, but becoming hardened by the accumulation of sap which is insufficient for their full perfection, they

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Parts not matured—Not developed—Change from excess—One organ changing to another—Peduncles and petioles become tendrils—Buds, how transformed?

then exhibit the short, indurated process, called a thorn. It is said that wild plants by rich cultivation do in time become divested of their thorns, which change into what they seemed originally destined for, viz., leaves and branches. *Prickles*, such as may be seen upon the rose, gooseberry, and other plants, do not change by cultivation, for these are a natural appendage, originating from the bark; while the thorn may be found connected with the wood, of which it makes a part.

324. The *diseases of plants** (for these organized beings are, like animals, subject to disease and death) may, in many cases, arise from causes within the knowledge of the attentive naturalist. 1st. We notice *constitutional diseases.* Of this class are the *varied hues* of some leaves, such as the box and holly; this is supposed to be owing to certain juices which, by changing their elements, vary the color of the leaf. 2d. Plants become diseased by being subjected to *too great*, or *too scanty a supply of food*, as light, heat, water, air, and soil. Excess of *light* causes an escape of oxygen, and a too rapid deposit of carbon; the sap, incapable of sustaining so great a degree of action, becomes exhausted, the plant withers, and the leaves fall off. In this situation the food should be either increased by watering, or the vegetation retarded by diminishing the light. *Excess of heat* absorbs the juices of the plant; *deficiency of heat* produces dropsy, and the plant losing its leaves, ultimately decomposes. More water is evaporated by a plant than is retained for its nourishment; therefore the absorption by the roots (*endosmosis*) should be in proportion to the evaporation by the leaves. 3d. *External injuries* often affect the health of plants. *Rains* injure the wood by penetrating through apertures in the bark; the bark itself seems from its nature better fitted to bear the action of the weather. *Winds*, when violent, are mechanically destructive to vegetables; when moderate, the agitation which they produce is thought to be advantageous, by favoring the descent of the cambium, and promoting a more free circulation of the other juices. *Smoke* is injurious to plants, it being composed of particles which, though invisible to our sight, are yet too gross to be absorbed by the minute pores of the leaves; it serves, therefore, to obstruct these pores, and prevent their exhaling the oxygen gas which is necessary for the decomposition of the carbonic acid, and the consequent deposition of carbon.

4th. Plants sustain injuries from *animals*, which produce diseases. *Insects* in particular make their way into the bark and external coats of the plant and deposit their eggs; these eggs

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* Their study constitutes a department of Botany called *pathology;* a term derived from two Greek words, *pathos*, disease, and *logos*, account of.

Prickles.—324. Diseases of plants—1st, Constitutional—2d, Excess or deficiency—3d, External injuries—Rains—Wind—Smoke—4th, Injuries from animals.

when hatched produce larvæ, which, by their peculiar juices, often rot the wood. Of these insects called *cynips*, one kind produces the hard protuberances on trees of different kinds which are called gall-nuts; others which are softer and more spongy are called *apple-galls*, or berry-galls. Another kind of insect called *cochineal*, attaches itself to the bark of trees, and preys upon the juices. One species of the cochineal is of a brilliant scarlet color and much valued for its use in dyeing; this species feeds on the *Cactus cochinillifer*, a Mexican plant.

5th. *Diseases are produced by plants preying upon each other, either by fastening themselves upon their surfaces, or by so near a location as to deprive others of their necessary food. Parasites* fasten themselves upon the surfaces of other plants; they are distinguished into two kinds, *false* and *true parasites;* the former adhere to the plant without feeding on its juices, as mosses and lichens; they derive their nourishment from the atmosphere, but they injure the tree by harboring insects and attracting moisture which often rots the part of the stem on which they grow. The mistleto is a true parasite whose root, piercing the bark of trees, plants itself in the alburnum, and absorbs food from it in the same manner as if it were fixed in the soil. The Pterospora is a very curious parasite which is sometimes found upon the leaves of shrubs, but more frequently upon the branches and leaves of trees. Mushrooms are of the class of false parasites. *Smut* is a black fungus which fastens itself upon the ears of oats and other grain. The *rot* is a fungous excrescence which preys upon the seed if seeds which have this disease fastened upon them are sown the rot will be propagated also. *Ergot* is a disease mostly confined to rye; *rust* is chiefly confined to the grasses: both are of the fungi family.

6th. *Diseases resulting from age.* Plants differ from animals in one important circumstance,—the *latter develop their organs at once;* these organs in process of time become indurated and obstructed, until they at length decay from old age. Plants on the contrary renew themselves every year; that is, they form new vessels to convey the juices, new leaves to elaborate them, and new buds to produce flowers and fruits. Plants do not, then, like animals, seem destined to die with old age; or there does not appear to be in perennial plants any prescribed term of existence. The production of fruit exhausts the vital energy of the plant, in annuals in one year, in biennials in two, in perennials in a longer or shorter period according to their natural constitution and the quantity of fruit which they produce.

Apple-trees, which bear heavy loads of fruit are short-lived in comparison with the oak which perfects from each flower but one of six seeds, and this fruit is but a small acorn. Some trees exist which are supposed to be of great age; in the Island of Teneriffe is the DRACÆNA *draco*, which, according to many circumstances, appears to have some thousand years of age. In England, at Blenheim Park, it is said, may be seen trunks of trees which shaded the bower of fair Rosamond, supposed to be not less than a thousand years old. At Hartford, in Connecticut, is the Charter-oak, which was a hollow tree in the days of James II., nearly two hundred years ago. In the hollow of this tree was concealed the charter of the state, when the king of England, through his agents, attempted to deprive the colonists of that guarantee of their civil rights. This oak must, even at that period, have been an aged tree.

325. *Economical uses of various Plants.*—We perceive among the various species of vegetable beings, *some which seem destined only to beautify* and *enliven* the earth; *others*, with little or no beauty, *are valuable only for their utility;* and in some instances we find utility and beauty united. Trees are not only beautiful, but many of them are highly useful, affording fuel, shelter, and shade, nuts, berries, and other fruits; their bark is used in tanning, for medicine, and spices; and their sap, secretions, fruit, and roots, furnish sugar and various medicinal extracts. Trees, with respect to their wood, may be divided: 1st, into such as have hard wood, as the oak, elm, apple, &c.: 2d, such as have soft wood, as the poplar and willow: 3d, such as have resinous wood, as the pine and fir: 4th, such as are evergreens but not resinous, as the evergreen oak of the south of Europe. Hard wood is considered best for fuel; as it contains the greatest quantity of carbon it causes a more intense and permanent heat: resinous wood containing more hydrogen, burns with a more brilliant flame.

326. The fermented juice of the grape produces wine. Grain of different kinds produces gin, whisky, &c. Apples, by their fermentation produce cider; this liquor, concentrated by distillation, produces brandy and alcohol. The vineyards of Italy and France, and of some of the Atlantic islands, are the most celebrated for their wine. In America, the vine does not flourish in the same luxuriance as upon the eastern continent. *Grasses are the palms of cold climates;* they are of the class of monocotyledons, and have endogenous stems. Some are perennial, some annual, the meadow-grasses are of the former kind. The grains, Indian corn, and rice, are annual. Gramineous

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Aged trees—Charter-oak.—325. Some plants chiefly valuable for beauty, others for utility—Division of trees with respect to wood.—326. Liquors produced from plants—Grasses.

plants, although very important, as furnishing from their leaves food for cattle, are yet more especially useful for their seeds, which furnish food for man. Some plants furnish oils, which are of important uses in various ways. The fixed oils are extracted from plants called oleaginous; they may be considered under three heads: 1st, *olive-oil*, produced from the olive in warm countries; 2d, *nut-oil*, of temperate climates, as obtained from walnuts, &c.; 3d, *linseed-oil*, obtained from the seed of oleaginous or oily plants. Many of the labiate plants, as thyme, sage, &c., are used in cookery. The Cruciform family afford the cabbage, cauliflower, turnips, &c.; the Leguminous family, beans, peas, &c. The Cucurbitaceæ furnish us with melons, squashes, and cucumbers; umbelliferous plants, with the aromatics, as caraway, coriander, &c., which are useful in medicine and confectionery. The plants chiefly used in domestic economy differ in different climates and countries; some, as many kinds of grain and grasses, are in common use in all countries; while others, as the bread-fruit and plantain, are only used in the few countries which produce them. The bread-corn of the temperate climates is chiefly wheat, rice, and maze; rice is a substitute for these in warm countries, and barley in cold countries. The *esculent* roots of the old world are chiefly the yam, carrot, and turnip; of the new, the potato. The *pot-herbs*, such as the cabbage, sea-kale, and others of the cruciform family, are mostly used in temperate climates.

LECTURE XLI.

HISTORY OF BOTANY, FROM THE CREATION OF THE WORLD TO THE DISCOVERY OF AMERICA.

327. We now propose to give a brief sketch of the progress of botanical knowledge; and as this is closely connected with other branches of natural science, a history of the advancement of the one will necessarily be in some degree a record of the march of the others. Natural Philosophy, Chemistry, and Botany, were all nursed in the same cradle, and thus grew and gained strength side by side; though Botany (at first rude and imperfect) may be considered the elder sister.

328. After becoming familiar with a science, the mind natu

Oleaginous plants—Labiate and Cruciform plants—Melons—Umbelliferous plants—Bread-corn—Pot-herbs—Legumes.—327. History of botanical science.—328. Why do we wish to learn the progress of science?

rally seeks for information respecting its origin and the progress by which it advanced from the first rude conceptions which might have been formed, to its gradual development and comparative perfection. The history of the progress of a science makes a part of the science itself; we are interested in the various efforts of philosophers, their experience and observations, and the trains of reasoning by which they arrived at those conclusions which constitute the basis of the science. In Botany, as in the other sciences, physical wants were the first guides; man at first sought to find in vegetables, food, then remedies for diseases, and lastly, amusement and instruction.

329. The first account of plants may be traced to the history of the creation by Moses. It was on the third day of this great work that God said, "Let the earth bring forth grass, the herb yielding seed, and the fruit-tree yielding fruit after his kind, *whose seed is in itself*, upon the earth: and it was so; and the earth brought forth grass, and the herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind; and *God saw that it was good*." After this, it is recorded, that God gave to Adam every herb and every *tree bearing fruit;* the latter was for him exclusively, but to the beasts of the earth, and the fowls of the air, and to every thing wherein there is life, he also gave the *green herb* for meat. Adam, according to Holy Scripture, gave names to all the beasts of the field, and the fowls of the air; and Milton imagines, that to Eve was assigned the pleasant task of giving names to flowers and numbering the tribes of plants. When our first parents, as a punishment for their disobedience, are about to leave their delightful Eden, Eve, in the language of the poet, with bitter regret exclaims:

"Must I thus leave thee, Paradise?
* * * * * Oh flowers
That never will in other climate grow,
* * which I bred up with tender hand,
From the first opening bud, and *gave ye names;*
Who now shall rear ye to the sun, *or rank*
Your tribes?"

330. The Bible and the poems of Homer afford us the only vestiges of the botanical knowledge of the earliest ages of the world. Great advantages were afforded to the Jews for obtaining a knowledge of plants, in their long wanderings over the face of the earth before they settled in Judea. When in possession of that fertile country they extended their intercourse with foreign nations; the vessels of Solomon frequented the shores of the Red Sea, the Persian Gulf, and the East Indian islands. In

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329. First account of plants traced to the history of the creation—Milton imagines that Eve gave names to the plants.—**330.** What is known of the progress of botany during the earliest ages of the world?

the Book of Kings it is said, "God gave Solomon wisdom and understanding above all the children of the East country, and all the wisdom of Egypt, for he was wiser than all men. He spake proverbs and songs; he also spake of *trees*, from the *cedar-tree* that is in Lebanon, even unto the *hyssop* that springeth out of the wall; and people from all countries came to hear his wisdom." The *Magi*, or "wise men of the East," cultivated the sciences to a great extent; but they kept their discoveries in mysterious concealment, in order the better to tyrannize over the minds of the people. Their researches were in a great measure lost to the world. Greece, however, received from Asia and Egypt the first elements of knowledge.

331. The *philosophers of Greece*, too eager to learn nature at one glance, were not satisfied with the slow process of observation and experiment, and to ascend from particular facts to general principles, but they believed themselves able by the force of their own genius, to build up systems which would explain all phenomena; supposing that man had in his mind preconceived ideas of what *nature ought to be.* This error in the philosophy of the ancients for a long time obstructed the progress of all science; and it was not until laying aside this false notion, and admitting that the only sure method of learning nature is to study her works, that the labors of philosophers began to be followed by important discoveries. Some of the ancient Greek philosophers asserted, that plants were organized like animals, that they possessed sensible and rational souls capable of desires and fears, pleasure and pain. *Pythagoras of Samos*, who travelled in Egypt, and was there instructed by the priests of the goddess Isis, is said by Pliny to have been *the first of the Greek writers who composed a treatise on the properties of plants.* A disciple of his, Empedocles, seemed to have some correct ideas of vegetable physiology. He called seeds, the *eggs of plants;* the roots, their heads and mouths; and considered that the two sexes were combined in the same individual. Hippocrates wrote upon the medicinal properties of plants; but his descriptions are vague, and cannot be applied to plants with any degree of certainty. *Aristotle*, perceiving that the course taken by preceding philosophers had not conducted them to the true knowledge of things, partially renounced their false ideas, and rested more upon observation and experience. In his researches he was favored by Alexander, of whom he had been the preceptor. That conqueror, in the midst of pride and the fury of passion, still possessed the love of true glory, and a desire that his conquests might serve to promote the improvement

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Solomon is said to have spoken of trees and other plants—The Magi.—331. Philosophers of Greece—Pythagoras—Empedocles—Hippocrates.

of the human mind; he allowed to Aristotle, in the prosecution of his scientific inquiries, every facility that wealth and power could bestow. Aristotle believed, that in nature there was a regular progress from inorganized matter upward to man, and from man upward to the Deity; that beings were connected together by certain affinities, composing an immense chain, of which the links were all connected. But,

> "Lives the man whose universal eye
> Has swept at once the unbounded scheme of things?
> Has any seen
> The *mighty chain of beings*, lessening down
> From infinite perfection, to the brink
> Of dreary nothing, desolate abyss?"

332. This idea of a regular chain of beings, presenting itself with such grandeur and simplicity, has had many admirers; but facts do not correspond with this theory. In the vegetable kingdom we should find it impossible to trace a regular gradation from the oak to a moss (if we were to make these the extremes of the chain of vegetable substances), and say exactly in what part of the scale each family of plants should be placed; it would rather seem, in many cases, as if the links of the chain had been broken or disunited. Aristotle considered plants as intermediate between inorganized matter and animals. "Plants," he said, "are not distinguished from animals in being destitute of the seat of life, the heart: because of this the reptiles and inferior orders of animals are also destitute; but plants have no consciousness of themselves, or organs of sense to know what is out of themselves; animals possess these faculties; therefore they are different." We think it would have been difficult for him to have discovered any evidence of consciousness in the sponge, or any marks by which it might appear that this animal substance (for such it is thought to be) has the knowledge of any thing external to itself. However great may be the veneration entertained for the opinions of Aristotle, we believe his distinction between plants and animals will at this time find no supporters. This philosopher published his works on natural history about three hundred and eighty-four years before Christ. *Theophrastus*, the friend and pupil of Aristotle, published "A History of Plants," and "The Causes of Vegetation." He treated separately of *aquatic* plants, *parasites*, *culinary* herbs, and *flowering plants;* he remarked upon the uses of each plant, the place where it grew, and whether it was woody or herbaceous. *He had no idea of genera or species;* his names were merely local, and his descriptions generally indefinite. His views upon the *physiology of plants* were superior to his *descrip-*

Aristotle.—332. Regular chain of beings—Various opinions of Aristotle—Theophrastus.

tions of them; he remarked upon their *different external organs;* distinguished the seed-lobes (Cotyledons) from the leaves; gave just ideas of their functions, and the offices of the root. He explained their anatomy as well as possible without the assistance of the microscope, which (as the science of optics was then unknown) had not been invented. Theophrastus seemed too much inclined to compare the structure of vegetables to that of animals; imagining that he found in plants bones and arteries. A shrub which grows in the Antilles is named Theophrasta, in honor of this ancient botanist. *Dioscorides*, a physician of Greek extraction, about the commencement of the Christian era, travelled over Greece, Asia Minor, and Italy, in order to observe the plants of those countries; his works were written in Greek: he divided plants into four classes, viz.: 1st, *aromatic;* 2d, *vinous;* 3d, *medicinal;* 4th, *alimentary* or *nutritious.* The labors of this botanist were of little value on account of want of method in his descriptions. He gave the names and properties of six hundred plants; but having no idea of species or genera, his work was but a chaos of facts, which were so imperfectly expressed as to render it impossible to apply them to use.

333. *The elder Pliny, who lived in the reign of Nero*, treated of the history of plants, but he neglected nature, and derived his science from the works of his predecessors. False systems of philosophy seemed to fetter the noblest minds, and prevent their pursuing those methods of investigation which would have led to a true knowledge of nature. The genius of Pliny was vast and active; he consecrated to scientific researches and literary works, the leisure which public duties left him. His "History of the World," which was a compilation of all the knowledge of the ancients upon the subject of natural history, the only one of his writings which has escaped the ravages of time and barbarians, is but a small portion of his labors. He is considered faulty in recording both truth and error, often transmitting them without observation or criticism, and sometimes favoring absurd traditions; but his work is justly admired for the greatness of its plan, which embraced the *whole of nature*, for the elegance of its style, and for the wonderful art with which the highest considerations of practical philosophy are associated with natural history. In the year 79 after Christ, Pliny fell a sacrifice to his desire of knowledge, in an eruption of Mount Vesuvius; wishing to contemplate as near as possible so sublime a spectacle, he perished, suffocated by the sulphureous exhalations.

334. *Galen, in the second century*, wrote upon the medicinal qualities of plants, but gave no descriptions. The love of the sciences seemed, in the prosperous days of Rome, to be extin-

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Dioscorides.—333. Pliny.—334. Galen—Condition of science in the most prosperous days of Rome guished; "Mistress of the world," corrupted by victories, and by tyrants, she had abandoned herself to luxury. The false philosophy of the vanquished Greeks reigned in the schools of victorious Rome, chasing away every trace of true knowledge. Religious fanaticism had also its influence; pretended Christians, as well as Pagans, destroyed libraries and the monuments of literature, sacred and profane. At this time the barbarians of the North and West precipitated themselves upon a country weakened by effeminate habits. Italy, ravaged by the Huns and Vandals, became successively the prey of the Heruli, of the Goths and Lombards. These people, nursed in war, abhorred the sciences and arts; and believing they were unfavorable to courage, allowed not their children to cultivate them. The Latin ceased to be the common language, and a corrupt mixture of barbarous languages took its place. The population was greatly diminished; the country, formerly fertile and cultivated became overgrown with forests and inhabited by wild beasts. In this dark period Botany shared the fate of other sciences. The monks, strangers to the first elements of literature, and yet passing for the lights of their age, spake in a barbarous language of the plants of Theophrastus and Pliny, commented upon writings they were incapable of comprehending, and mingled with their errors respecting facts the most shameful superstitions.

335. The state of science was thus gloomy in the empire of the West, when Charlemagne vainly endeavored to relight the torch of human knowledge in this barbarous age. Charlemagne entered into a correspondence with the famous Calif of the Saracens, Haroun Alraschid, a man who greatly contributed towards polishing and enlightening the Arabians; and who preferred the friendship of the King of France to that of all the princes of Europe, because none, like Charlemagne, possessed a desire for intellectual greatness. After the death of Charlemagne, which took place in the year 814, Europe became involved in still greater mental darkness than before. When the Western empire, weakened by luxury and effeminacy, had fallen an easy prey into the hands of barbarians, the empire of the East, though feeble, yet preserved the precious deposits of ancient literature; but the greater part of the learned, occupied with the subtleties of scholastic theology, made no effort to enlarge the boundaries of natural science. Religious intolerance drove from the empire many enlightened men, who, banished by the emperor Theodosius, carried among the Arabs the taste for Greek and Latin literature, and founded schools upon the shores of the Euphrates, where they taught rhetoric, languages,

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Barbarians ravage Italy—Language corrupted—Botany shared the fate of other sciences—335. Charlemagne—Decline of learning in the Empire of the East.

and medicine. The Arabs, fond of mysteries, and led by their genius and ardent imaginations to the cultivation of poetry and works of fiction, seemed to have little taste for sciences which required assiduous application and patient investigation. Urged on by fanaticism, under Mahomet they were the conquerors and scourges of the civilized world. Alexandria experienced their ruthless violence. This city, by turns the asylum and tomb of letters, had witnessed under the first of the Cesars the destruction of the library collected by the Ptolemies; under Aurelian, that founded by Augustus; under Theodosius, that which Antony had given to Cleopatra; and for the fourth time in possession of an immense collection of books, acquired through her love for philosophy, this city saw her magnificent library reduced to ashes by the victorious Saracens. This barbarous but noble race at length became imbued with the love of science; a succession of califs (among whom was Haroun Alraschid, the friend of Charlemagne), by their devotion to learning, rendered Bagdad the most enlightened city of the earth. Their learned men began to construct maps of conquered countries, and to describe objects of natural history; distant voyages extended and multiplied their commercial relations; and mathematics, medicine, and natural history were cultivated with ardor. When the Arabs had conquered Spain, they carried thither letters and arts, and their schools became celebrated throughout the world. In the 11th century the French, Italians, Germans, and English went to them to learn the elements of science. The Arabians preserved their superiority in the sciences at least, if not in literature, until towards the close of the 15th century. But when this people, divested gradually of their European conquests, were at last driven from Spain into Africa, they seemed, as if by instinct, to replunge into the savage ignorance from whence they had been drawn by the efforts of a few great minds. The Arabs had considered plants more as physicians and agriculturists than as botanists; but although their descriptions of plants were imperfect, their labors were not useless to botanical science. They discovered many plants of Persia, India, and China, which were unknown to the ancients. They, however, fell into the error of dwelling more upon the works of Aristotle, Theophrastus, Dioscorides, and Pliny, than of observing nature; believing that nature herself must be wrong when she deviated from those celebrated philosophers.

336. The *Crusades*, commencing at the close of the 11th century, and continuing until towards the middle of the 13th,

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Literature carried among the Arabs—Destruction of the Alexandrian Library—Bagdad famous for learning—Schools of Arabs in Spain—Remarks upon the Arabian botanists.—336. The Crusades prove the barbarity of the times; yet we cannot doubt that these distant and romantic expeditions were in part suggested by the desire of change, and the vague wish to see and to know new things, and hastened the awakening of the human mind from the sleep of ages.

337. The 12th and 13th centuries witnessed in Italy the revival of a taste for letters and the fine arts. The commerce of that country was flourishing, the people made long voyages by sea, and in the accounts which they published, spoke of the vegetable productions of the countries they had visited in such a manner as excited the curiosity of the nations of Europe.

338. About this period it is supposed *herbariums, or collections of dried plants, began to be preserved. This was an important era in botanical science; for nature is ever true and incapable of leading into error, while descriptions may give false views of natural objects.* The science of Botany was not enriched by a single work of any merit, from the fall of the Roman empire, a period which marked the decay of literature, until the 15th century. Those in the dark ages who pretended to any knowledge of plants, only quoted from the Greek and Roman writers, but they were ignorant even of the languages in which their works were written. In the 15th century Italy was governed by wise princes, who were influenced by a desire to promote knowledge among their people. They invited to their country learned men from Greece, from whom they might learn the language of Homer and Aristotle. At this time the Turks threatened Constantinople, and that capital of the empire of the East at length fell into their hands. *The literature of Greece now took refuge in Italy;* the ancient languages were revived, and at this time translations of ancient writers, with learned commentaries, were given. But these labors, although exercising an important influence upon literature, were not equally fortunate with respect to the progress of natural history The learned writings of antiquity were accurately studied, but, blinded by the brilliancy of great names, men of learning looked not upon nature; they had yet to learn, that without examining and comparing real objects, there can be no solid foundation in natural history.

339. *About this period a physician of Germany published some indifferent descriptions of plants, accompanied by a few engravings. This connection of drawing and botany although the whole was badly executed, was considered as an important improvement in the science.* While Italy was thus a second time enriched with the literary treasures of Greece, Spain and Portugal were becoming enlightened by intercourse with foreign

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337 Revival of Literature.—338. Herbariums made.—339. Literature of Greece transferred to Italy nations. The Portuguese extended their voyages to the western coasts of Africa and the Cape de Verd Islands; the Cape of Good Hope was at length discovered, and Vasco de Gama, sailing around it, reached the East Indies. It was at this period that Christopher Columbus discovered the New World.

340. This event, so important to the old world, is to us who inhabit this pleasant and favored country one of deep interest. Ages passed on after the creation of the world and America remained, with regard to the eastern continent, as though she existed not. The lofty Andes raised their snowy heads to the clouds, the majestic Amazon rolled onward to the Atlantic, our lakes spread out their vast expanse of waters, our Hudson and Mississippi received their tributary streams and bore them to the ocean;—but to what people were these grandeurs presented, and what were the changes in the moral world, while nature thus moved on in her unchanging course?—History is silent! Yet while in the old world empires had been rising, continuing for centuries stationary, and then decaying, succeeded, and succeeded by others pursuing the same track, were no moral changes going on in the American continent? Had no mighty nations ever existed here; had no arts or letters been cultivated; was the savage Indian for thousands of years sole lord of one half of the world?—And when, and how did the first inhabitants of this continent come from Asia, where man was placed at his creation? These are inquiries which naturally arise on tracing the historic page through so long a period of time until suddenly this new world bursts upon our vision! But, though many speculations have from time to time appeared respecting the probable history of America before its discovery by Columbus, the subject is still shrouded in darkness and obscurity.

LECTURE XLII.

HISTORY OF BOTANY FROM THE BEGINNING OF THE SIXTEENTH CENTURY TO THE TIME OF LINNÆUS.—FROM THE TIME OF LINNÆUS TO THE PRESENT.

341. About the period of the discovery of America *botanic gardens began to be cultivated;* these afforded new opportunities for investigation, by comprehending the vegetables of all countries within such limits as enabled the botanist to compare them, and to watch their growth and different stages of devel-

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New world discovered.—340. America before this period.—341. Botanic gardens first cultivated opment. From the days of Theophrastus until the beginning of the 16th century, Botany, instead of becoming more perfect, had been rendered more obscure. This was not owing to want of attention or labor, but to the false rules of philosophy which had so long prevailed. At length the cause of the evil seemed to be discovered. Many writers protested against the erroneous opinions of their times; they said, "*Our blind respect for the ancients is an insurmountable obstacle to the progress of Botany.* We expect to find everywhere the plants of Theophrastus, Dioscorides, and Pliny; whereas they did not know one-hundredth part of the plants which cover the globe. The first of them never went out of Greece; the second left only unconnected notes, treating without order upon the medicinal qualities of plants; and Pliny copied these notes without comment or criticism. We cannot apply to the plants of Germany or France the names under which the ancients described those of Italy, Greece, and Asia; before studying the plants of foreign countries we ought to know those of our own. Of what use are disputes about the nature and qualities of species when we are not able to distinguish one from another? *The true method of doing this is to explore the plains, valleys, and mountains, to examine and compare the plants of our own and foreign countries. Libraries alone are insufficient to make botanists.*" These reflections led to a happy revolution, not only in this science, but in all others; it may be called the *era of true philosophy.** Yet the principles which were now discovered were not much applied to science until the time of Bacon, Newton, Linnæus, and Locke; and it remained for the late Thomas Brown, of Edinburgh, to show that the human mind itself is subject to the same general laws of inquiry which now regulate investigations in the physical sciences.

342. Up to the period of which we are now speaking plants had only been described in alphabetical order; about this time some German botanists attempted a *collection of individual plants into species;* this improvement was received with much approbation. *These species were arranged according to certain general resemblances, or natural relations;* thus we see that natural methods were prior to any attempts at an artificial system.

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* Lord Bacon is generally considered as having first taught the proper method of studying the sciences, viz. by ascending from facts to principles; this is called the method of induction. It has recently been asserted by an able writer, in one of our first American periodicals, that Bacon was not the author of the inductive philosophy, but that he borrowed his rules of philosophizing from Aristotle, whose real principles had for ages been misunderstood. It is to be hoped that men of talents will not so far depart from the true rules of philosophizing, as to devote that time in contending about their author which might be profitably applied in the application of these rules to the investigation of truth and nature.

Botanists began to discover the obstacles to the progress of science—Era of true philosophy—342. Improvements of German botanists

343. *In the beginning of the 16th century* we find the names of many who were engaged in investigating the vegetable kingdom. Some are commemorated by the names of plants; Leonard Fuschs of Germany by the plant Fuschsia; Lobelius, physician to James I., by the Lobelia; and Lonicer, by the Lonicera. *Lobelius distinguished the cotyledons of seeds, divided monocotyledonous from dicotyledonous plants, and attempted to form families by grouping species according to their natural relations. Zaluzian, of Bohemia, labored to perfect the natural groups of former botanists; he is the first of the moderns who positively affirmed the existence of stamens and pistils in all species of plants, and suggested the necessity of these organs.*

344. But notwithstanding the labors of many learned men, little real improvement would have been made in the science of Botany had there not, at that time, existed some minds of superior genius, who turned their attention to tracing some proper method of classification. These were Gesner, Clusius, Cæsalpinus, and Bauhin; of the latter name were two brothers, both of whom are deservedly celebrated. *Gesner*, called the Pliny of Germany, born in 1516, was of an obscure and humble origin, but possessed of a powerful and penetrating mind. *He attempted to make a general collection of the objects of natural history; he explored the Alps, and discovered many plants until then unknown.* He is distinguished from those who had gone before him in his suggestions that there existed in the vegetable kingdom *genera*, each one composed of many species, united by similar characters of the flowers and fruit. Soon after the publication of this opinion, botanists began to understand that the different families of plants have among themselves *natural relations, founded upon resemblances and affinities*, and that the most obvious are not always the most important. These are fundamental truths; and *the distinction of species, the establishment of genera, and of natural families*, seemed to follow of course, after these principles were once established. The *Tulipa gesneriana* and genus Gesneria have been dedicated to this botanist.

345. *Clusius* was born in 1526; his parents had destined him for the profession of law, but his decided taste for Botany induced him to abandon this profession. Though he was learned in the ancient and modern languages, his enthusiasm for natural history induced him to lay aside every other pursuit. He traveled over almost all the west of Europe in order to make discoveries in the vegetable kingdom, and soon excelled all the botanists of the age in the knowledge of both native plants and

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343. Botanists of the 16th century— Lobelius—Zaluzian.—**344.** Gesner.- **345.** Clusius, the first who proposed to divide plants into classes.

exotics. He had the direction of the imperial garden at Vienna, and afterward was public professor of Botany at Leyden. His enthusiasm for this science terminated only with his life. *Before his time the art of describing plants with precision and accuracy was unknown; but, unlike the descriptions of his predecessors, his were neither faulty from superfluous terms, nor from the omission of important circumstances.*

346. *Cæsalpinus*, a native of Florence, who was contemporary with Clusius, proposed to form *species into classes.* The characters which he employed for this purpose were, the *duration*, and *size of plants; presence*, or *absence of flowers; the number of cotyledons;* the situation of the seed, as erect or pendent; the *adherence of the pericarp to the seeds;* the *number of cells in the pericarp*, and the *number of seeds* which they contained; the *adherence* of the *calyx* to the *ovary;* and the *nature of the root*, whether *bulbous* or *fibrous.* This method was too imperfect to be followed, having neither the simplicity nor the unity to render its application useful.

347. *John Bauhin* was the friend and pupil of Gesner; *he composed a general history of plants.* Gaspard Bauhin, a younger brother, no less active and learned, conceived the design of a work *which should contain a history of all known plants, together with the different names which other writers had applied to the same plant.* Clusius and the elder Bauhin had imagined something like a genus of plants, formed by the grouping of similar species, but Gaspard Bauhin expressed this more decidedly in remarks upon generic distinctions. His work, the result of forty years' labor, was of great assistance to Linnæus in perfecting our present system of Botany. We find, in looking back upon the labors of botanists during the 16th century, that more had been accomplished than during any former period; the character of novelty and originality exhibited in these researches is highly creditable to those who thus led the way in the march of improvement.

348. The 17th century, in its commencement, was not favorable to the sciences. Europe was agitated by continual wars, and the arts of peace were neglected; but *in the last part of that age a taste for natural history revived; men of highly gifted minds applied themselves to the study of Botany, and many undertook long voyages, with the sole design of examining foreign plants.* Botanists were astonished at the great number of interesting plants discovered by travelers in the region of South Africa, around the Cape of Good Hope, and in the East India islands. Two Dutch botanists of the name of *Commelin*,

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346. Cæsalpinus—Characters employed by him in the formation of classes.—**347.** The Bauhins Retrospect of the 16th century.—**348.** Botany in the 17th century who wrote about this period, are commemorated in the beautiful genus Commelina, first discovered in America. *Bonnet*, of Geneva, a close observer of facts, wrote upon the "*Nature and Offices of Leaves;*" and a work entitled, "*Contemplation of Nature, or the Regeneration of Beings.*" *Gaertner* of Germany wrote upon fruits, or, as he termed this department of the science, *Carpology*. He *dissected the fruits of more than a thousand plants, the figures of which he designed and engraved.* To *Gleditsch*, professor of Botany at Frankfort, is dedicated the genus Gleditscha. *Rudbeck* the younger, who preceded Linnæus as professor of Botany in Upsal, was, by the latter, commemorated in the genus Rudbeckia. *At this period the plants of our own country began to excite the curiosity of scientific Europeans.* Louis XIV. sent to America *Plumier*, a man celebrated for his mathematical and botanical knowledge, and who was styled Botanist to the King. He gave drawings and descriptions of more American species than any other traveler had done. The *practice of naming newly discovered plants after distinguished botanists became common.* History now presents us with many who were distinguished by their efforts in the cause of science.

349. Botanists now began to study *the stamens and pistils of plants;* and it was suggested that the science would remain imperfect as long as species and genera were undefined. *Orders* and *classes* also were recommended, and *natural resemblances* and *affinities studied. A work was written upon the umbelliferous plants;* this was the first attempt at describing in one mass any single group of plants by characters peculiar to the whole.* This was followed by several attempts to form a natural method of classification; among the most approved of these methods was that of Ray, who published a work called "*A General History* of Plants;" in this he divided all plants into thirty-three classes, twenty-seven of which were composed of *herbs*, the rest of *trees*. The first botanist who proposed to class plants without any reference to their being either herbs or trees, was a German, of the name of *Rivannus*, who proposed to consider, as the foundation of classification, the *absence or presence of flowers; the manner in which they were situated*, or *their inflorescence; the number of petals; the regular or irregular form of the corolla; the adherence or non-adherence of the calyx to the ovary; the nature of the pericarp; the number of seeds and of cotyledons.* A botanist of the name of *Magnol* at this time was honored by having his name given to the splen-

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* The author of this was Robert Morrison, a Scotchman. These *monographs*, or descriptions of single families, are now of great value; no botanist can thoroughly investigate the whole vegetable kingdom; but by close attention to one department important discoveries may be made.

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349. Various improvements in Botany—Ray—Rivannus—Magnol.

did Magnolia, an American plant, which then began to be known in Europe.

350. *Joseph Pitton de Tournefort* was born in 1656. While very young, he discovered an enthusiastic fondness for botanical pursuits: he had been destined by his friends for a profession; but his genius seemed so strongly bent upon the study of nature, that he was at length permitted to indulge without restraint in his favorite pursuits. *He ranged over the Alps and Pyrenees, and many provinces of France, collecting the flowery treasures offered by those fertile regions;* often in peril from banditti, and exposing his life to hazards in climbing terrific precipices, or amidst the glaciers of the mountains. The method of Tournefort, which was founded upon the form of the corolla, although imperfect, greatly assisted the progress of Linnæus, who stands unrivaled in this department of Natural History.

351. The attempts of botanists previous to this time had been chiefly directed toward the *attainment of some proper method for the arrangement of plants;* the attention of some investigating minds was now turned toward their *Anatomy and Physiology.* Since the days of the first Greek naturalists, these departments of botanical science had lain neglected; but the confused opinions of the ancients now served to suggest experiments which resulted in new observations and solid discoveries.

352. *The invention of the microscope* threw light upon the mysteries of nature, which without this instrument must ever have remained in obscurity; *by its assistance botanists studied the internal structure of vegetables;* they described the *heart, wood,* and *pith;* they perceived the newly *formed bud,* yet invisible to the naked eye; the *future plant existing in the bulb,* and *even in the seed; pores* were discovered, which were found to be the organs of the expiration and inspiration of gases, thrown out as noxious, or inhaled as nutritious. Leuwenhoek, Grew, Malpighi, and Camerarius, are among the first of the moderns who investigated the internal structure of vegetables. The *importance of the stamen and pistil as essential to the perfection of the seed began to be suspected.*

353. As yet, however, the science of Botany lay in scattered fragments of various imperfect and contending systems; much labor had been bestowed, and great improvements made, but there was no central point around which these improvements might be collected. The learned world were sensible of the deficiency; but it required genius, great observation of nature, and courage to stem the tide of popular prejudices, in

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350. Tournefort.—351. Attention of botanists turned toward anatomy and physiology.—352. Microscope.—353. Science of Botany yet imperfect.

him who should come forward to attempt the work of reform. *Charles Von Linnæus*, an inhabitant of Sweden, suddenly emerging from obscurity, *offered to the world a system of Botany so far superior to all others, as to leave no room for dispute as to its comparative merit.* All preceding systems were immediately laid aside, and the classification of Linnæus was received with scarcely a dissenting voice. Linnæus extended the principles of his classification to the animal and mineral kingdom; in the language of an eminent botanist,* "His magic pen turned the wilds of Lapland into fairy fields, and the animals of Sweden came to be classed by him as they went to Adam in the garden of Eden to receive each his particular name."

354. Linnæus was born in 1707; his father was a clergyman, and had designed his son for the same sacred office; but seeing him leave his studies to gather flowers, he inferred that he possessed a weak and trifling mind, unfit for close investigation, and was about to put him to a mechanical employment, when some discerning persons, perceiving in his devotion to the works of nature the germ of a great and lofty mind, placed him in a situation favorable to the development of his peculiar talents, where he was allowed, without restraint, to study the book of nature,

> "This elder Scripture, writ by God's own hand."

Linnæus formed anew the language of botanical science; every organ of the plant he defined with precision, and gave it an appropriate name; every important modification was designated by a particular term. Thus comparisons became easy, and confusion was avoided. The characters of plants appeared in a new light. Each species took, besides the name of the genus to which it belonged, a specific name, which recalled some peculiarity distinctive of the species. Before that time, the species, instead of being thus designated, required in some cases a whole sentence to express the name. But what most tended to render the works of Linnæus popular, was his artificial system, in which he had made the stamens and pistils subservient to a most simple and clear arrangement; he remarked the *different insertion of the stamens; their union by means of their filaments had been before observed, but he employed them in a manner entirely original.* This "*Northern Light*," as he has sometimes been termed, contributed to the progress of physiology, both by his own discoveries, and by improving upon the suggestions of those who had gone before him. In the details of science he was no less accurate than bold and comprehensive in his general views. The world knew not which to admire most, the multiplicity, the novelty, or the profound views of this modern Aristotle. His school became the resort of men of science from all Europe; and he seemed to have acquired that influence over the human mind which had been peculiar to the ancient philosophers of Greece. The defects of this great man, for human nature is never without its imperfections, were, that he sometimes carried too far a favorite idea; endowed with a brilliant imagination, he was at times somewhat blinded by the beauty of his conceptions, and strove to reconcile nature to the visions of his own fancy.

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* Sir James E. Smith.

354. Birth of Linnæus, &c.—What were the improvements made by Linnæus ?—What most rendered his works popular ?—How did he contribute to the progress of physiology, &c. ?

355. We have, in our investigations of the artificial system, occasionally pointed out some imperfections, particularly in the separation of natural families; but though all admit this as a defect, no system or method has yet been offered so simple and so beautiful as the *Artificial System* of Linnæus. This great man died in 1778; he is honored among the scientific by a title far more proud than any hereditary distinctions, that of "*Prince of Naturalists.*" His most important works are, "Philosophy of Botany," "Genera and Species of Plants," "System of Nature," and "Flowers of Sweden, Lapland," &c. The *Linnæa borealis* was dedicated to him by Gronovius. Ten years after his death a society distinguished by his name was founded in London; this is now in possession of his library, herbariums, collections of insects and shells, with numerous manuscripts. Sir James Edward Smith, the founder of this society, translated the writings of Linnæus, and illustrated them by his own comments.

356. The study of plants after the discoveries and classifications of Linnæus became in a degree general. The *knowledge of vegetable physiology began to be usefully applied to agriculture.* Duhamel of France successfully labored to exhibit the connection between the science of Botany and the cultivation of plants. *Bossuet* of Geneva proved by experiments that the *vascular system of plants is tubular and transparent; and that leaves perform the office of respiration.* *Grew* of England had before this period ascertained the *existence of the cambium*, and *Duhamel* afterward proved that it was distinct from the sap and proper juices. The latter opposed the idea till then entertained, that earth and water were the only food of plants; he proved that the various solids and fluids diffused in the soil and atmosphere are all important to vegetation.

357. The observations of *Priestley*, *De Saussure*, and others,

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355. Death of Linnæus—His works—Linnæan Society in London.—356. Knowledge of Botany after Linnæus—Duhamel and Grew.—357. Priestley. &c.

aided by the discoveries made in pneumatic chemistry of the existence of oxygen, hydrogen, and carbonic acid gases, formed a new era in the history of vegetable physiology. It *was proved that vegetables do ultimately consist of oxygen*, *hydrogen*, and *carbon*, sometimes of a small quantity of nitrogen combined with mineral salts, and often some silex, sulphur, and iron. These elementary substances were found to be diffused through air and water, and the animal and vegetable substances which the latter holds in solution: the green parts of vegetables were observed to exhale oxygen in the light, and carbonic acid gas in the dark; and the carbon left by the decomposition of the carbonic acid, was shown to be incorporated into the vegetable substance giving to the wood its strength and hardness.

358. The naturalist whose labors in point of utility will best bear a comparison with those of Linnæus, is *Bernard de Jussieu.* An unambitious man, he was remarkable for the extent of his knowledge, the penetration of his genius, and the solidity of his judgment. The love of truth and science were with him sufficient incitements to the most severe labor. "Many of our contemporaries," says Mirbel, "knew this sage; they say that never have they seen so much knowledge combined with so high a degree of candor and modesty." To this botanist we are indebted for a natural method of classification superior to those of his predecessors, and one on which has been founded the system of natural classification now in use. Jussieu proposed a method of classing plants *according to certain distinctions in the seed*, which were found to be universal; this was perfected and published by his nephew, *Antoine-Laurent de Jussieu*, and is now generally received as the best mode of natural classification which has yet been discovered. This *method is called natural because it aims to bring into groups such genera of plants as resemble each other in medicinal and other properties*, while the system of Linnæus is called artificial because by a certain rule plants which have no such resemblance in their properties are brought together. We therefore find in one of the Linnæan classes the poisonous flag and the nutritious grass, the grain which supports life and the darnel which destroys it; in another the healthful potato and the poison mandrake, the deadly hemlock and the grateful coriander. Throughout this system we meet with similar contrasts in the qualities of the plants which are collected into the same classes. Nor are their external appearances less unlike; for here the oleander and pig-weed, the tulip and the dock, meet in the same classes. This system, it should always be remembered, is not the whole science of Botany, but is the *key* to the *natural method*, *by which*, alone, we

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358. Character of Jussieu—His natural method of classing plants.

should find great difficulty in ascertaining the names of plants; it is, as it were, a stepping-stone by which we must ascend to the valuable knowledge which cannot well be reached in any other way. The *more practical a botanist becomes*, the *less need he has for this assistance; the eye becomes quick to seize on natural characters without reference to the dictionary, as the artificial system is aptly termed.* Thus a pupil, in studying a language, may in time be able to dispense with his dictionary; though he could not have proceeded at first without its assistance.

For more particular explanations of Jussieu's method, the pupil is referred to the comparison of that with the method of Linnæus and Tournefort in the remarks on classification, and to the Natural Orders contained in Part V. of this volume.

359. *Adanson*, previous to the time of the younger Jussieu, had published a system of classification, *in which he arranged plants according to the resemblances observed in all their organs.* In one class all plants with similar *roots* were placed; in another, all which had similar *stems;* a third was arranged by resemblance of *leaves* in their forms and situations; but the most important distinctions he considered as founded upon the *organs of fructification.* The name of this ingenious botanist is commemorated in the huge Adansonia, or calabash-tree, of Africa, which is considered as the Colossus of the vegetable kingdom. *Louis Richard*, a French botanist, wrote an interesting account of the Orchidaceæ of Europe, and assisted in compiling from ancient works a very useful *botanical dictionary. Des Fontaines* first *showed that the stems of monocotyledonous and of dicotyledonous plants differ from each other in their structure and modes of growth;* he divided them into *endogenous* and *exogenous.*

360. *Mirbel*, a distinguished professor of Botany in Paris, has pursued his inquiries into the *anatomical and physiological structure* of plants, to an extent not exceeded by any other naturalist; his "*Elemens de Botanique*," with many essays on the science, are now quoted as high authority.

361. *Baron Humboldt* investigated the vegetable productions of the equatorial regions in America; his remarks on vegetables, as a criterion of climate, are original and interesting.

362. De Candolle's "Elementary Theory of Botany" is highly valued as a scientific and able performance; but it is useful rather for those who have already attained a knowledge of the elements of botany than for the beginner in the science. The natural method of Jussieu has been modified and improved by the labors of *De Candolle*, *Mirbel*, *Lindley*, and *Robert Brown.* The *Natural System* of Lindley, founded upon Jussieu's classi

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359. Adanson—Richard.—360. Mirbel.—361. Humboldt.—362. De Candolle

fication, is that which we have, with some modifications, introduced into this work.

364. Referring to the infancy of Botany in the United States we find the name of *Bartram* as that of the first native of our country who was conspicuous for botanical researches. *Houston* investigated the region of Canada and described many of its plants; in honor of him is named the little flower, HOUSTONIA *cœrulia*. *Clayton* made a list of Virginian plants, and is commemorated in the beautiful CLAYTONIA *virginica*. *Kalm*, a pupil of Linnæus, whose name is given to the KALMIA (American laurel), spent three years in America, and returned to Europe laden with botanical treasures; the sight of the American plants brought by his pupil, many of which were entirely new to him, is said to have produced such an effect upon Linnæus, that although lying ill of the gout, his spirits were rekindled, and in the delight of his mind he forgot his bodily anguish and recovered from his disease. Among the earliest botanists of North America, were *Colden*, *Michaux*, and *Muhlenberg*. *Pursh* was the first who finished a system of North American plants so arranged as to be useful to the student. Some of the first teachers of the science were *Barton*, *Hosack*, and *Mitchell*. The first public lecturer on botany, was Amos Eaton, founder of the Rensselaer School at Troy, N. Y. Dr. Darlington has pursued the study of the plants of Pennsylvania with zeal and success, and added much to the American Flora. Eaton's Manual of Botany was followed by Nuttall's Genera, Elliott's, Barton's, Darlington's, Torrey's, Bigelow's, and Beck's Floras. To Gray and Torrey, Botany is indebted for full and accurate descriptions of American plants. The author of this volume would humbly acknowledge her gratitude to the *Giver of all good* for having in some degree been made instrumental by means of her various works on the physical sciences, in diffusing a love for them and a habit of referring the works of nature to their GREAT CREATOR.

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364. American Botanists

LECTURE XLIV.

GENERAL VIEW OF NATURE—ORGANIZED AND INORGANIZED BODIES—CLASSIFICATION OF ANIMALS.

365. HAVING considered the vegetable kingdom under its various aspects, it may be proper before closing our course of botanical study to take a general view of that external world of matter, of which the part we have examined extended and diversified as it is, constitutes but a very small portion. The science we have been investigating is a branch of *Natural Science.* The *study of nature* presents in a lively and forcible manner the power and wisdom of the Creator, and offers to the enlightened mind a never-failing source of the most pure and refined enjoyment. Those who know nothing of this source of happiness cannot appreciate its value; they may ask the *use* of studying into the nature of objects without reference to the enjoyment of the senses, or to personal gain or honor.

366. Naturalists to the great discredit of science have sometimes shown an unhappy tendency to skepticism; enabled to comprehend some of the great operations of nature, they have presumed to set up their own reason against the revelation of God, and impiously refused to believe any thing which could not be explained according to the principles of human science. Searching into the elements which compose the human body, and observing the dispersion of the same and their incorporation into other substances, they have affirmed that it was "a thing impossible for God to raise the dead." Well might we, in addressing such a philosopher, say, with the Apostle, "Thou fool!" Cannot He who formed all things of nothing, reanimate the sleeping dust, and reunite the spirit to its *own* body? Happily, this melancholy perversion of human learning seems passing away, and we now see many of the enlightened investigators of the principles of science, among the humble disciples of Jesus.

367. By the word *Nature*, derived from a term signifying *born* or *produced*, in a general sense we mean all the works of God. Using a figure of speech called *metonomy*, we often put the effect for the cause; as when we speak of the "works of nature," meaning what the Almighty has brought forth: or we often mean by nature the Deity himself; as when we say that "nature produces plants and animals."

368. With respect to the *heavenly bodies* which manifest themselves to us with so much magnificence, we know them to

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365. Study of nature.—366. Naturalists inclined to skepticism.—367. Definition of nature.—368. The heavenly bodies.

be *matter* because we observe them to be subject to the laws which govern matter; and we have been able by the discoveries of astronomers to understand their various revolutions: we have, in general, clearer ideas of their motions than even of our own planet; it is more easy for us to imagine them as moving, than that our firm earth is whirling with inconceivable velocity. Were it possible for us to conceive the quantity of matter which even one world as large as our sun contains, the thought would be overwhelming;—and of all the worlds which we behold at one view in a serene night, what finite being can imagine their united extent? They are suspended over our heads each one pursuing its destined course; why do we not fear that some one may be precipitated upon our little world and crush it to atoms? It is because we know that they are all upheld by that Power which "created the heavens and the earth," and who governs the universe by regular laws. *This universe is as infinite as the God who formed it; our sun, with all its systems, is but a point lost in immensity.* Astronomers have proved that the fixed stars are at such an immense distance from us, that moving at the rate of 500 miles an hour we should not reach the nearest of them in 700,000 years, a distance more than 200,000 times greater than that of the sun from the earth. Space no less distant, probably, separates all the fixed stars. *Around those stars revolve millions of opaque globes, as our earth revolves around the sun which is also one of the fixed stars.* The satellites describe around the primary planets almost circular orbits; they are carried with their primaries around the sun in their annual motion. *The sun himself with all his numerous train of primary planets, each with its satellites, revolves around the common center of gravity of the fixed stars, of which, himself, constitutes a part; and these are supposed to revolve around the center of the universe. Here may be the throne of the Almighty Creator and Director of all these stupendous objects.*

369. Yet we need not fear that we shall be forgotten in the immensity of creation; the same Being who created and rules the host of heaven, made the little moss and the lilies of the field which are so beautifully arrayed. If God condescends to care for them, he will not neglect us who are made in his own image, and destined to an immortal existence.

Turning our thoughts from the heavenly host to our own little globe, and considering the matter which exists upon it, we find two great classes of substances; 1st, *inorganized*, and 2d, *organized*.

370. The 1st *class of substances*, viz., such as are *inorganized*,

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369. Substances divided into two classes.—370. First class of substances.

comprehends all matter destitute of a living principle; as *fluids*, *gases*, and *minerals*. The particles which compose them are entirely subject to chemical and mechanical laws.

The 2d *class*, viz., *organized* substances, includes animals and vegetables; the particles constituting them are in a perpetual state of motion; they are supported by air and food, endowed with life, and subject to death; the active power of life which operates in them we call the *vital principle*. This vital principle eludes the researches of man; all that we know of it is in its effects, enabling the organized body to resist putrefaction, and, to a certain degree, to maintain a temperature different from surrounding bodies. Deprived of this vital principle, both animals and vegetables become subject to chemical decomposition; their solid parts are dissolved, and they return to the earth from whence they were taken.

371. If we dig up a stone and remove it from one place to another, it will suffer no alteration; if we dig up a plant it will wither and die. If we break a mineral to pieces, every fragment will be a perfect specimen of its kind; it will only be altered in shape and size: but if we tear off a branch from a plant, or if a limb be taken from an animal, the portion thus separated will decay; the vital principle being extinguished, putrefaction and dissolution follow. *We should never have been able to predict, from the appearance of the stone, the plant, and animal, that they were thus differently constituted;* by observations, we find that the productions and mode of growth have been attended with different circumstances. We find that *the stone has grown by a gradual accumulation of particles independent of each other, and can only be destroyed by chemical or mechanical force; the plant and animal have, on the contrary, grown by nourishment, been possessed of parts mutually dependent, and contributing to the existence of each other.*

372. So far, our observation teaches us the distinction between organized and inorganized beings; though it does not teach us in what the internal power of life consists. God permits us to know much, in order to lead us to industry in the attainment of knowledge; but he places boundaries beyond which we may not pass, that we may be humble.

COMPARISON OF ORGANIC AND INORGANIC BODIES.

INORGANIC BODIES.	ORGANIC BODIES.
Structure.	
Their parts always analogous to, and not depending on each other: thus a fragment of stone is as much a stone as the block or rock to which it belonged.	*Their parts are mutually dependent:* thus *stem, leaf, flower,* &c. do not constitute a vegetable being, except as they are *united;* it is the same with the different parts of an animal.

Second class of substances—Vital principle.—371. Difference between a stone and a plant.—372. Structure of inorganic bodies—Of organic bodies.

Origin.

Molecular attraction, modified by time and space, or by the art of man (as in chemistry); they are *made.*	*Owe their existence to beings similar to themselves*, produced either from eggs, or brought into existence in a living state; they are *hatched* or *born.*

Development.

They grow by the addition of new particles: they are hence said to *increase by juxtaposition* or *accretion.*	*They develop by assimilating to their nature, or converting to their sustenance, foreign substances which they absorb*, or receive internally: *they increase by nourishment.*

Termination.

They are limited to no particular form (except in the case of crystals); they have no life, and are not subject to death; they *decompose.*	*They have a determinate form and duration*, their existence terminates either by old age, or disease; they *die.*

373. It is difficult to explain the difference between the different kinds of organized beings, viz. animals and vegetables; the lines of distinction often seem to fade so gradually that we cannot well decide where the animal ends and the vegetable begins. It might at first occasion some surprise that there should be the least doubt in distinguishing an animal from a vegetable; one could readily decide between a rose and a nightingale, an oak or ox, but these are animals and vegetables in a *perfect state.*

374. The perfect animal has the power to move about to seek the nourishment most agreeable; it can utter audible sounds, and possesses sensation and apparent consciousness. The plant, on the contrary, is confined to a particular spot, having no other nourishment than substances which themselves come in contact with it; exhibiting no consciousness, nor, to common observation, any sensation. It is only when we examine with close attention the various phenomena in the vegetable and animal kingdoms, that we learn to doubt as to the exact boundaries by which they are separated.

375. The division of nature into three kingdoms, animal, vegetable, and mineral, is very ancient, and appears at first to be clear and precise.

Minerals are destitute of life; they increase by the accumulation of new particles.

Vegetables grow, produce seeds which contain the elements of future plants like themselves, and then die.

Animals unite to the properties of vegetables the feeling of their own existence; or as Linnæus has said, "*Stones grow; vegetables grow* and *live; animals grow*, *live*, and *feel;*" but we are not able to decide where, in the vast series of organized beings, *sensation ceases*, or where it begins.

376. A very general and simple classification of animals is

Origin of inorganic bodies—Of organic bodies—Development of inorganic bodies—Of organic bodies—Termination of inorganic bodies—Of organic bodies.—373. Distinction between the different kinds of organized beings.—374. The perfect animal—The plant.—375. Minerals—Vegetables—Animals—Zoology.

as follows :—" VERTEBRAL ANIMALS, having backbones : AVERTEBRAL ANIMALS, destitute of backbones. VERTEBRAL animals are divided into, 1. *Quadrupeds ;*—the science of which has no popular name ; it includes four-footed animals, as ox, dog, mouse. 2. *Birds ;*—the science of which is called *ornithology ;* it includes the feathered tribe, as pigeon, goose, wren. 3. *Amphibious Animals ;*—the science of which is called *amphibiology ;* it includes those cold-blooded animals which are capable of living on dry land, or in the water, as tortoise, lizard, serpent, frog. 4. *Fishes ;*—the science of which is called *ichthyology ;* it includes all aquatic animals which have gills and fins ; as shad, trout, sturgeon, eel. AVERTEBRAL animals are divided into, 5. *Insects ;*—the science of which is called *entomology ;* it includes all animals with jointed bodies, which have jointed limbs, as flies, spiders, lobsters. 6. *Vermes ;*—the science of which is called *helminthology ;* it includes all soft animals of the avertebral division, which have no jointed limbs, with or without hard coverings, as angle-worms, snails, oysters, polypi, and infusory animals."

377. *Zoophytes*, or animal plants, bring us to the lowest beings in the animal kingdom. Some of the orders of this class contain animals which have neither heart, brains, nerves, nor any apparent means of breathing. These are sometimes called *animal plants ;* many of them, as the *corals*, are fixed to rocks, and change place. The term coral includes under it many species ; the red coral used for ornaments is the most beautiful. The substance of coral, when subjected to chemical analysis is found to consist chiefly of *carbonate* of lime ; the hard crust which envelops the animal substance is an excretion formed by it in the same way as the shells of the oyster and lobster are produced, or as nails grow upon the fingers and toes of the human body. The quantity of this carbonate of lime elaborated by the little coral animal is truly wonderful ; islands are formed, and harbors blocked up by it. Fig. 165, *a*, represents a branching coral ; the dots show the apertures by which the animal receives its nourishment. Some of the zoophytes are fixed by a kind of root to the bottom of the sea ; some, as the *sea-nettle*, which appears like the segment of a circle, are carried about by the motion of the waters, without any voluntary motion, as are also the *sea-daisy*, *sea-marigold*, and the *sea-carnation*, so named from an apparent resemblance to those plants. We find here the *sea-fan*, the *sea-pen*, and the *madrepore*, the latter of which are often thrown together in vast quantities.

378. The *sponge* also belongs to this class of animal sub-

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376. Division of animals into two classes—How many classes of Vertebral animals ?—How are Avertebral animals divided ?—377. Description of zoophytes—Corals—Various kinds of zoophytes.—378. Sponge.

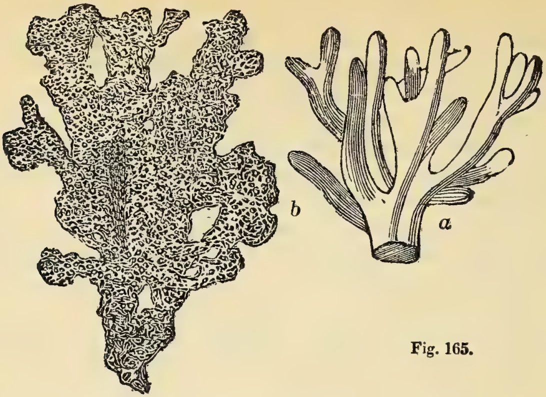

Fig. 165.

stances; it consists of a fibrous mass, containing a jelly-like substance, which, when touched, discovers a slight sensation, the only sign of life manifested by it. There are many species of sponge; those most valued in the arts are found in the Mediterranean Sea, and Indian Ocean. Some grow upon rocks, and are found covering the interior of submarine caves. The *Spongia parasitica* is seen growing upon the back and legs of a species of crab; sometimes as many as forty individual sponges extend themselves over the crab impeding the motion of its joints, spreading like a cloak over its back, or forming for its head grotesque and towering ornaments, from which the poor crab vainly attempts to disencumber itself. Some species of the sponge grow to a very large size; one has been found in the East Indies in the form of a cup capable of containing ten gallons of water. The fibrous part of the sponge is the skeleton of the animal; the large apertures (see Fig. 158, *b*) serve to carry out fluids from within; while the water by which the animal is nourished, is imbibed by minute pores: this continual circulation of water is one of the most important functions of the living sponge. *These animals resemble plants in their manner of producing others;* they form a species of germ, like the bud growing upon the stalk; this falls from the stem and becomes a perfect animal. If a part of one of these animals be separated from the rest, it will, itself, be as perfect a living animal as was the whole before. A polypus can be divided into as many animals as it contains atoms; some of this order are very properly called hydras (many-headed). Besides these there is another order of animal substances, *infusoria*, which appear like a homogeneous mass, having no appearance of any limbs whatever; these are either angular, oval, or globular.

Manner in which these animals are reproduced—Recapitulation.

379. After a glance upward to the heavenly bodies we returned to our globe, and considered the various substances on its surface. At the head of the animal kingdom we found *man*, sufficiently resembling brute animals in his material frame to constitute part of an extensive class, embracing the ape, elephant, and dog; yet between the lowest degree of intelligence in the human race, and the highest faculties of brutes, there is a line of distinction marked by the hand of the Almighty, in characters too obvious for doubt. God said, "Let us make man in our own image, and he breathed into him the breath of life, and man became a living *soul*."

380. Some writers have attempted to show that man differs only from the inferior order of animals in possessing a greater variety of instincts. But however wonderful may appear the instinctive perception of brutes, they are destitute of reason, and incapable of being the subjects of moral government; we must, therefore, both from our own observation and the declarations of Scripture, infer that the faculties of man differ, not in *degree* only, but distinctly in their *nature*, from those of all other beings upon our globe.

381. "Man (says Buffon), by his form and the perfection of his organs, and as the only being on earth endowed with reason, seems properly placed at the head of the kingdom of nature. All in him announces the lord of the earth; his form marks his superiority over all living beings; he stands erect, in the attitude of command; he can gaze upon the heavens; on his face is imprinted the character of dignity; the image of his soul is painted upon his features, and the excellence of his nature penetrates through his material organs, and animates the expression of his countenance."

382. In the orders of animals nearest to man we find the senses of sight, touch, taste, and smell, equally perfect as those possessed by him, and in some cases they are even more acute; but as we proceed downward through the gradations of animal existence, we perceive the number and acuteness of the senses to diminish—we find some beings with but four senses, some with three, others with two, and lastly, in zoophytes, we find only the sense of touch, and that so faintly exhibited as almost to lead us to doubt its existence.

Let us now return to the distinction between animals and vegetables. We perceive that although we would find no difficulty with regard to a nightingale and a rose to discover to which of the kingdoms of nature they belong, yet with respect to a sponge or coral, a *mushroom* or *lichen*, it would be somewhat difficult without a previous knowledge of their natural

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379. Man at the head of the animal kingdom.—380. How resembling inferior animals?—381. Buffon's remarks.—382. Gradation downward.

history, to say which is called animal and which vegetable We have seen among the zoophytes, that the polypus, like a vegetable, may be increased by cutting shoots and ingrafting them upon other animals. With respect to *sensation*, some plants seem to possess this, apparently even in a greater degree than some of the last orders of animals:—the *sensitive-plant* shrinks from the touch; the *Dionea* suddenly closes its leaves upon the insect which touches them; the leaves of plants follow the direction of light in order to present their upper surfaces to its influence, as may be observed in flower-pots placed in a window. The seed of a plant in whatever situation it may be placed in the earth, always sends its root downward and its stem upward; in these cases, does there not seem as much appearance of sensation and instinct, and even more, than in the lower orders of animals?

383. We find, then, that the *possession, or want of instinct, does not constitute a mark of distinction between animals and plants.*

Some have attempted to draw a line of distinction, by considering that *locomotion*, or *the power of changing place, belongs to animals only;* but this criterion seems to fail, since we find *animals fixed to the bottom of the sea*, or *growing upon rocks*, and *plants moving upon the surface of the water.*

Another mark of distinction has been given, in the *supposed presence of nitrogen in animals*, detected by a peculiar odor when animal substances are burning, similar to what we perceive in the combustion of bones; but *nitrogen having been discovered in some vegetables*, this *proof is no longer considered infallible.*

384. It appears, then, from a comparison between animals and vegetables, that *these beings* are *closely connected by the essential characters* of *organization;* that it is *impossible to distinguish them by any trait that belongs exclusively to either: that the connection between them appears the most striking in the least perfect species of both kingdoms;* and that, as we recede from this point, the differences become more numerous and more marked. We may illustrate this view by imagining two ascending chains rising from one common point, each side of the chain becoming more and more unlike in proportion to the intervening distance from the center. *From this same, central point* also *proceeds the chain of inorganized substances;—some imperfect animals resembling plants in their outward form; some, both of animals and plants, resembling minerals in their hard and calcareous coverings and shapeless forms.*

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383. Distinction between animals and plants.—**384.** Resemblances.

385. Having thus learned the almost imperceptible gradations by which the animal and vegetable kingdoms are blended, we must, in stating the important differences which exist between animals and plants, consider the imperfect species of both kinds as exceptions to any general rule and confine ourselves to perfect animals and plants.

1st. *Plants differ from animals with respect to the elements which compose them; carbon, hydrogen, and oxygen, form the base of vegetable substances; animals exhibit the same elements, with this important distinction, that carbon prevails in plants, and nitrogen in animal food.*

2d. *They differ in their food; plants are nourished with inorganized matter, absorbed with water, which holds in solution various substances; animals are mostly nourished either by vegetables or other animals.*

3d. *Plants throw off oxygen gas and inhale carbonic acid; animals, in respiration, inhale oxygen gas and throw off carbonic acid.*

4th. *Although plants and animals both possess a principle of life, it is in the one case much more limited than in the other; exhibiting itself in plants by a feeble power of contraction or irritability; in animals appearing in sensation, muscular movement, and voluntary motion.*

386. We see, then, many important *differences* between perfect animals and perfect plants. We have pointed out striking *analogies* between the two great divisions of organized bodies: this subject might be greatly enlarged. We will close this subject by a few remarks on the inorganic matter upon, and around the earth.

387. *Inorganic* bodies form the solid base of the globe. *Minerals* are spread upon the face of the earth, or lie buried beneath its surface; they form vast masses of rocks, chains of mountains, and the ground upon which we tread. *Water* occupies a still greater surface of the earth than land: it is filled with life and animation;—the treasures and wonders of the deep seem almost unbounded. *Air*, lighter than earth and water, extending on all sides about forty miles in hight, surrounds the whole globe separating us from the unknown elements which exist beyond it. *Heat*, or *Caloric*, is a subtle fluid which pervades all matter in an increasing proportion from solids to fluids, and fluids to gases. *Light*, reflecting its hues from terrestrial objects, produces, by the decomposition of its rays, all the beautiful variety of coloring.

388. Wherever we turn our eyes we behold wonders; “A

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385. Result of the comparison between animals and vegetables—Chains of beings proceeding from one point.—386. Differences between animals and plants.—387. Different kinds of inorganic matter.

we go up to heaven, God is there;" "the firmament showeth forth his handywork;" if we contemplate the earth on which we are placed, with its varied tribes of beings, and the provision made for their comfort and subsistence, we realize that it is indeed God "who maketh the grass to grow on the mountains and herbs for the use of man."

389. The universe, how vast!—exceeding far
The bounds of human thought; millions of suns
With their attendant worlds moving around
Some common center, gravitation strange,
Beyond the power of finite minds to scan!
Can He, who in the highest heaven sublime,
Enthroned in glory, guides these mighty orbs—
Can He behold this little spot of earth,
Lost midst the grandeur of the heavenly host:
Can God bestow one thought on fallen man?
Turn, child of ignorance and narrow views,
Thy wildered sight from off these dazzling scenes;
Turn to thy earth, and trace the wonders there.
Who pencils, with variegated hues,
The lowly flower that decks the rippling stream,
Or gorgeously attires the lily race?
Who with attentive care, each year provides
A germ to renovate the dying plant,
And gives soft showers and vivifying warmth,
Kindling within the embryo inert
The little spark of life, unseen by all
Save him who gave it, and whose care preserved?
Who teaches, when this principle of life
Thus animated, swells the germ within,
And bursts its tomb, rising to light and air—
Who teaches root and stem to find their place,
Each one to seek its proper element?
Who gilds the insect's wings, and leads it forth
To feast on sweets and bask in sunny ray?
None can the life of plant or insect give,
Save God, alone:—He rules and watches all;
Scorns not the least of all his works; much less
Man, made in his image, destined to exist
When e'en yon brilliant worlds shall cease to be.
Then how should man rejoicing in his God,
Delight in his perfections shadowed forth
In every little flower and blade of grass!
Each opening bud, and care-perfected seed,
Is as a page, where we may read of God.

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388. The Deity manifested in his works.—**389.** The author's poetical view of the grandeur and minuteness of the works of God.

PART V.

THE NATURAL SYSTEM OF CLASSIFICATION.

390. THE great advantage of the Linnæan System consists in its offering the simplest and most easy method of finding the names of unknown plants; but the student should not rest here. When we become interested in an individual, we wish to know *more respecting him than his name;* we inquire about his *character*, his *connections*, and his *habits;*—and this is what we learn of plants by the *Natural* System of Botany.

In arranging the various genera described in this work according to the Natural System, we adopt, with some modifications, the system proposed by Jussieu, improved by De Candolle, and still further perfected by Lindley.

391. SYNOPTICAL VIEW OF THE CLASSES IN THE NATURAL SYSTEM.

SERIES I. **PHENOGAMOUS PLANTS.**	Exogenous growth; a dicotyledonous embryo.		CLASS I.—EXOGENS or DICOTYLEDONS.	
			Seeds in a pericarp.	Sub-class 1. ANGIOSPERMS.
			Seeds naked,	" 2. GYMNOSPERMS.
	Endogenous growth; a monocotyledonous embryo.		" II.—ENDOGENS or MONOCOTYLEDONS.	
SERIES II. **CRYPTOGAMOUS PLANTS.**	A distinct axis or stem and foliage.	Woody and vascular tissue.	" III.—ACROGENS.	
		Cellular tissue only.	" IV.—ANOPHYTES.	
	No distinction of stem and foliage, but all confounded in a thallus.		" V.—THALLOPHYTES.	

GENERAL VIEW OF THE NATURAL SYSTEM.

392. SERIES I.—FLOWERING OR PHENOGAMOUS *Plants.*

CLASS I.—EXOGENOUS OR DICOTYLEDONOUS Plants.

SUB-CLASS I.—ANGIOSPERMOUS, EXOGENOUS Plants.

DIVISION I.

POLYPETALOUS, EXOGENOUS Plants.—Under this division are twenty GROUPS, consisting of NATURAL ORDERS, from two to twelve in each group. The groups are founded on various circumstances, as the *number* of *ovaries*, their *coherence*, or *distinctness;* the *position* and *number* of *petals* and *stamens;* *position* of the *embryo* in the seed, whether the latter *contains albumen* or is *destitute* of it; *number* of *floral envelopes; calyx* and *petals persistent* or *caducous; trees*, or *shrubs; flowers, regular* or *irregular; situation of leaves; fruit united*, or *sep-*

arable into carpels, &c. Under this great division in the *first group of orders*, is the *Ranunculus*, a type of the order RANUNCULACEÆ; the *Magnolia*, a type of the order MAGNOLIACEÆ, with several other orders. In a *second group of orders*, the white Water-lily, *Nymphecæ*, is a type of the NYMPHACEÆ.

Thus we proceed through the twenty groups, in which we meet with a large number of the most conspicuous orders among the vegetable tribes—the VIOLACEÆ, or *violet tribe;* the MALVACEÆ, or *hollyhock tribe;* the CARYOPHYLLACEÆ, or *pink tribe;* the ROSACEÆ, or *rose tribe*, &c.

DIVISION II.

393. MONOPETALOUS or GAMOPETALOUS, Exogenous Plants.—Under this division are eleven GROUPS OF ORDERS, each group usually composed of fewer orders than the preceding division, and founded on various circumstances connected with the *situation of the ovary and seed; the number and situation of the stamens and pistils; regularity or irregularity of the flower*, &c. We find here the bell-flower, *Campanula*, a type of the order CAMPANULACEÆ; the *sun-flower*, the type of the COMPOSITÆ; the *Asclepias*, of the ASCLEPIADACEÆ, &c.

DIVISION III.

394. APETALOUS, Exogenous Plants.—This division consists of seven GROUPS OF ORDERS, in some cases composed but of one Order, for which no *alliance* is found. The groups are founded *on circumstances of the flowers, as perfect* or *imperfect;* the *situation and cells of the ovary; character of stipules; nature of the plant, as woody or herbaceous*, &c. We find in this division the Virginia snake-root, *Aristolochia*, as the type of the natural order ARISTOLOCHIACEÆ; the poke-weed, *Phytolaca*, the type of the natural order PHYTOLACACEÆ; the common pig-weed, *Chenopodium*, the type of the order CHENOPODIACEÆ; the elm, the type of the order ULMACEÆ, &c.; the oak, the walnut, the birch, willow, nettle, mulberry, hemp, &c., each standing the representative of a family, or natural order.

SUB-CLASS II.

395. GYMNOSPERMOUS, Exogenous Plants.—Plants with seeds naked or not inclosed in an ovary, the carpel being represented by an open scale, as in Pines; or by a more evident leaf, as in Cycas; or wanting altogether, as in the Yew. We find here the pine, the type of the natural order CONIFERÆ; *Cycas*, the type of the order CYCADACEÆ.

CLASS II.

396. ENDOGENOUS or MONOCOTYLEDONOUS Plants.—There are FIVE GROUPS in this class, each consisting of from one to twelve

Natural Orders: the groups are distinguished by circumstances of *inflorescence*, as whether flowers are *on a spadix*, or *not spadiaceous;* whether with *simple* or *double*, *regular* or *irregular* perianth; *flowers imbricated*, or with *glumaceous bracts.* The natural orders in the different groups are distinguished into *trees* or *herbaceous plants; aquatic* or *terrestrial;* anthers *introrse* or *extrorse;* glumes *single* or *numerous.* In this class we find the palm, the type of the natural order PALMACEÆ; the ARACEÆ or Arum family, the *Arum* (wild turnip) being the type; the TYPHACEÆ or Cat-tail family; the ORCHIDACEÆ or *Orchis* family; the IRIDACEÆ or *Iris* family; the GRAMINACEÆ or Grass family.

397. SERIES II.—FLOWERLESS OR CRYPTOGAMOUS *Plants.*

CLASS III.

ACROGENOUS, Flowerless Plants, propagated by spores instead of seeds; these have a *distinct axis* growing from the apex, with *woody* and *vascular* tissue, and usually *distinct* foliage. The orders in this class are *Equisetum* (scouring-rush), type of the Horsetail family; the fern, the type of the order FILICES, divided into many sub-orders; ground-pine, or club-moss, the type of the order LYCOPODIACEÆ.

CLASS IV.

398. ANOPHYTES—contains vegetables composed of *parenchyma* only; these are of Acrogenous growth, foliage sometimes distinct, often confluent into a frond, as mosses, liverworts, &c.

CLASS V.

399. THALLOPHYTES—contains vegetables of *cellular tissue* only, combined in a thallus, with no distinction of root, stem, or foliage, no distinct axis and leaves; the LICHENS are the highest order of this lowest of the vegetable series; from these we descend to Mushrooms, FUNGI, and to the green, shining moss which is found in ponds and ditches, consisting of a mere cellular mass, sometimes called brook-silk; these are of the order ALGÆ.

THE POLYPETALOUS ORDERS.

400. RANUNCULACEÆ, *the Crowfoot Tribe.—Herbs* or *undershrubs* with an acrid watery juice. *Leaves* simple, alternate or opposite, often variously lobed and subdivided, without stipules. *Sepals* 3–6, usually 5, deciduous. *Petals* 5–15, sometimes

none. *Stamens* numerous, distinct. *Carpels* numerous, 1-celled, distinct, or united into a single, many-celled carpel. *Seeds* numerous, erect or pendulous; *albumen* horny; *embryo* minute, at the base of the albumen, cordate.

a. Properties: Plants of this order are acrid, and more or less poisonous. The acridity is frequently volatile, and disappears when the plants are dried or heated. Some are valuable as dyes, and some are beautiful as ornamental flowers.

GENERA.—Clematis, Thalictrum, Anemone, Hepatica, Hydrastis, Adonis, Myosuros, Ranunculus, Caltha, Trollius, Helleborus, Coptis, Nigella, Aquilegia, Delphinium, Aconitum, Actæa, Macrotrys, Cimicifuga, Xanthorhiza, Pæonia, Podophyllum, Jeffersonia, Nectris.

Fig. 166, *a*, RANUNCULUS *bulbosus* (bulbous crowfoot); *b*, Pistil of RANUNCULUS *reptans*; *c*, a perpendicular section of one of its carpels; *d*, a similar section of its ripe achænium.

Fig. 166.

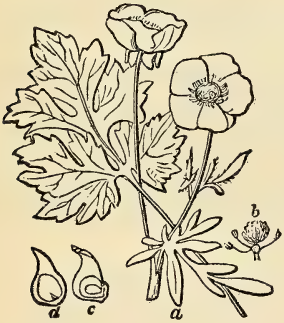


Fig. 167.

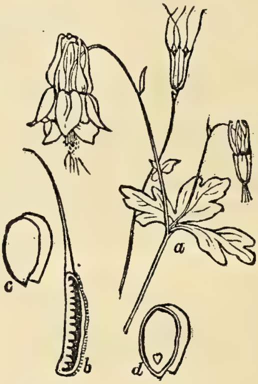


Fig 167, *a*, AQUILEGIA *vulgaris* (garden columbine); *b*, a pistil magnified, the ovary divided longitudinally; *c*, a seed magnified; *d*, a vertical section of the same showing the cordate embryo at the base of the albumen.

Fig. 168.

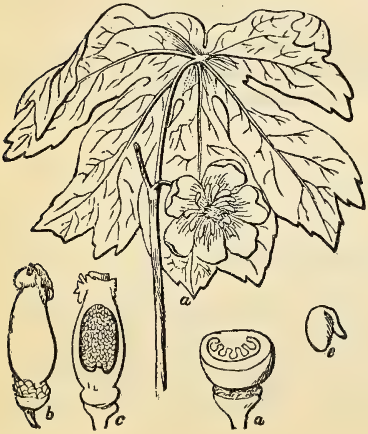


Fig. 169.

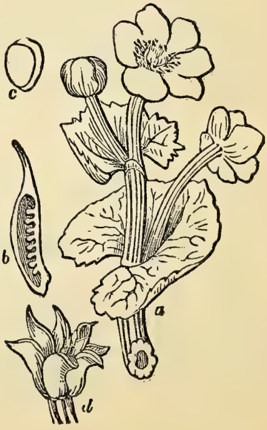


Fig. 168, *a*, Podophyllum *peltatum* (wild mandrake, May-apple); *b*, pistil enlarged; ovary ovoid, sessile, crowned by the large peltate stigma; *c*, vertical section of the same, showing the ovules crowded in rows upon the placenta which occupies the whole length of the cell; *d*, cross section of the same; *e*, an ovule magnified.

Fig. 169, *a*, Caltha *palustris* (American cowslip); *b*, vertical section of the pistil and ovary; *c*, ovule magnified; *d*, head of follicles.

Fig. 170, Hepatica *triloba* (liverwort); *root* fibrous; *leaves* radical, three-lobed flowers terminal.

Fig. 170.

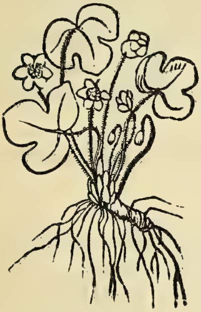


Fig. 171.

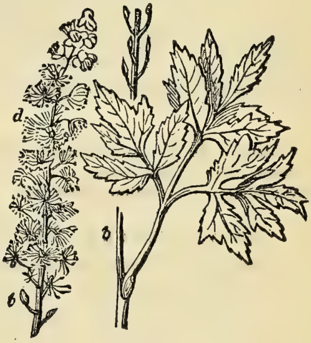


Fig. 171, Actea *racemosa* (black snake-root); long, ovate *raceme* (*a*), with centripetal inflorescence (the lower flowers first expanding; *stem* (*b*) tall, with bi-ternate leaves.

Fig. 172.

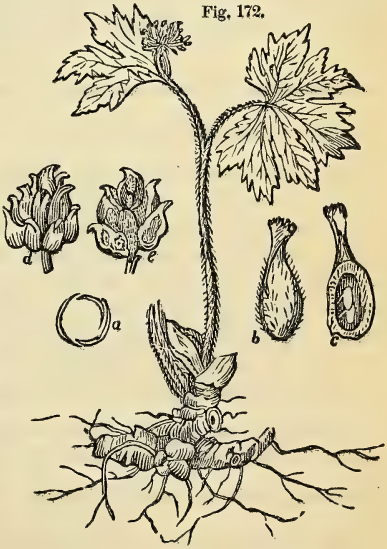


Fig. 172, Hydrastis *canadensis* (orange-root); *rhizome* bright yellow, thick knotted; *stem* simple, naked, with two, alternate, palmate leaves near the summit; *a*, diagram of the æstivation of the calyx; *b*, pistil magnified; *c*, vertical section of the ovary; *d*, pistils in fruit; *e*, vertical section of the same.

401. Magnoliaceæ, the *Magnolia Tribe.*—*Trees* or *shrubs*. *Leaves* alternate, coriaceous, stipules deciduous. *Flowers* large, solitary, usually odoriferous. *Sepals* 3–6, deciduous. *Petals* 3–27, in several rows. *Stamens* indefinite, distinct; *anthers* adnate, long. *Ovaries* numerous, simple, arranged upon the prolonged receptacle, 1-celled; *ovules* ascending or suspended. *Fruit* dry or succulent, consisting of numerous

carpels, distinct or partially cohering. *Seeds*, when ripe, often hang suspended from the carpels by a long slender cord; *embryo* minute, at the base of fleshy albumen.

a. Properties: bitter, tonic, and often aromatic.
GENERA.—Magnolia, Liriodendron, Illicium.

402. ANONACEÆ, *the Custard-Apple Tribe.*—*Trees* or *shrubs*. *Leaves* simple, alternate, without stipules. *Flowers* large, usually of a dull color. *Sepals* 3, persistent. *Petals* 6, in two rows, with a valvate æstivation. *Stamens* indefinite; *filaments* short. *Carpels* usually numerous, closely packed, sometimes cohering. *Fruit* succulent or dry. *Seeds* one or more; *testa* brittle; *embryo* minute, in the base of hard fleshy albumen.

a. Properties: they are generally aromatic and fragrant; some are bitter and tonic, others yield edible fruits.
GENERA.—Anona, Asimina, Porcelia.

403. MENISPERMACEÆ, *the Moon-seed Tribe.*—Climbing or twining *shrubs*. *Leaves* alternate, without stipules. *Flowers* small, usually racemose. *Sepals* and *petals* similar in appearance, in one or several rows, deciduous. *Stamens* as many as the petals, and opposite them, or 2–4 times as many; *anthers* often 4-celled. *Carpels* solitary or numerous, at first straight, but during their growth often curved into a ring. *Fruit* a succulent, 1-seeded, oblique or lunate drupe, or berry. *Seed* solitary; *embryo* large, inclosed in the thin fleshy albumen.

a. Properties: the roots are mostly bitter and tonic, fruit often narcotic and acrid.
GENERA.—Menispermum, Schizandra.

404. BERBERIDACEÆ, *the Berberry Tribe.*—*Herbs* or *shrubs*. *Leaves* alternate, compound, without stipules. *Sepals* 3–9, in one or several rows, deciduous. *Petals* equal in number to the sepals, and in two sets or twice as many, often having an appendage at the base on the inside. *Stamens* as many as the petals, and opposite them; *anthers* extrorse, cells opening by a valve. *Carpel* solitary, gibbous or oblique, 1-celled. *Fruit* baccate or capsular. *Seeds* sometimes with an aril; *embryo* minute, surrounded by fleshy or horny albumen.

a. Properties: the fruit is edible; the stem and bark of some species are astringent, they contain oxalic acid; the roots and herbage are sometimes poisonous.
GENERA.—Berberis, Leontice, Diphylla.

405. CABOMBACEÆ, *the Water-shield Tribe.*—Aquatic *herbs*. *Leaves* floating, peltate. *Flowers* axillary, solitary. *Sepals* 3

or 4, colored inside. *Petals* 3 or 4, alternate with the sepals. *Stamens* hypogynous, definite or indefinite; *filaments* slender; *anthers* linear, introrse. *Carpels* 2 or more. *Fruit* indehiscent. *Seeds* pendulous; *embryo* minute, inclosed in a membraneous bag at the extremity of abundant fleshy albumen.

GENUS.—Hydropeltis.

406. NELUMBIACEÆ, *the Water-bean Tribe.—Aquatic herbs*, with showy *flowers*, and peltate, floating *leaves*. *Sepals* 4 or 5, deciduous. *Petals* numerous, in several rows, inserted into the base of the torus. *Stamens* numerous, in several rows; *filaments* petaloid; *anthers* adnate and introrse. *Carpels* numerous, immersed in hollows of the large fleshy torus, in fruit forming hard, round *nuts*. *Seeds* solitary, destitute of albumen; *embryo* large, with 2 fleshy cotyledons.

GENUS.—Nelumbium.

407. NYMPHÆACEÆ, *the Water-Lily Tribe.*—Aquatic *herbs*. *Leaves* peltate or cordate, arising from a prostrate trunk or rhizoma, and raised above the water on long stalks, or floating on the surface. *Calyx* and *corolla* composed of several or numerous sepals and petals, which gradually pass into each other, the inner series passing into stamens. *Stamens* numerous, in several rows, inserted above or with the petals; many of the *filaments* petaloid; *anthers* adnate, introrse. *Ovary* many-celled, many-seeded. *Fruit* indehiscent, crowned by the radiate stigmas. *Seeds* very numerous, covering the spongy dissepiments. *Embryo* small, inclosed in a membraneous bag, and half immersed in the farinaceous albumen.

a. Properties: some are astringent and bitter, while others are said to be sedative.

GENERA.—Nymphæa, Nuphar, Victoria.

Fig. 173.

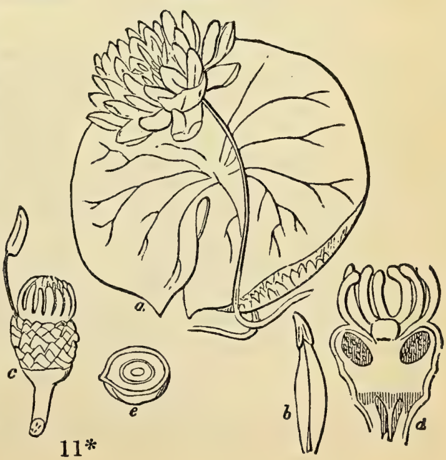


Fig. 173, *a*, NYMPHÆA *odorata* (pond-lily); *b*, a petaloid stamen or inner petal bearing an anther at its tip; *c*, a pistil, the floral envelopes, and all but one stamen removed; *d*, a vertical section of the pistil; *e*, transverse section of the base of a seed, cutting through the sac and embryo.

408. SARRACENIACEÆ, *the Side-saddle flower Tribe.*—Perennial *herbs*, found in boggy places. *Leaves* radical and hollow, pitcher or trumpet shaped. *Flower* solitary, on a long scape. *Sepals*

5, persistent, with three small bracts at the base. *Petals* 5, concave. *Stamens* numerous. *Ovary* 5-celled, persistent; *style* single; *stigma* large and petaloid, 5-angled. *Fruit* 5-celled, with a large placenta projecting into the cavity of the cells. *Seeds* numerous, albuminous; *embryo* small.

Genus.—Sarracenia.

Fig. 174.

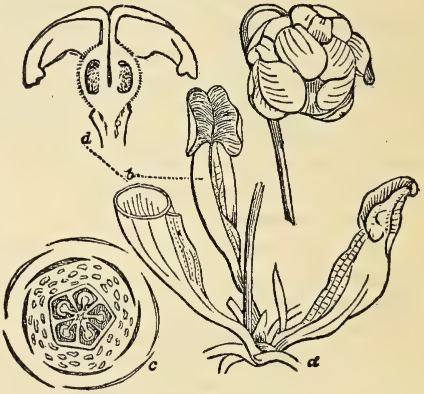


Fig. 174, *a*, Sarracenia *purpurea* (Side-saddle flower); *b*, a leaf cut across; *c*, diagram of the æstivation including an enlarged transverse section of the ovary; *d*, vertical section of the whole pistil, enlarged.

409. Papaveraceæ, *the Poppy Tribe.*—*Herbs* with milky or colored juice. *Leaves* alternate, without stipules. *Flowers* solitary, on long peduncles. *Calyx* of 2 caducous sepals. *Petals* usually 4, or some multiple of 4, cruciate, regular. *Stamens* numerous, sometimes a multiple of 4. *Ovary* solitary; *style* short or none; *stigmas* 2 or many; in the latter case, stellate upon the flat apex of the ovary. *Fruit* either silique-form, with 2, or capsular, with several parietal placentæ. *Seeds* numerous; *embryo* minute, at the base of fleshy and oily albumen.

a. Properties: narcotic, anodyne.

Genera.—Papaver, Argemone, Sanguinaria, Glaucium, Chelidonium, Dendromecon, Platystemon, Chryseis, Meconopsis.

Fig. 175.

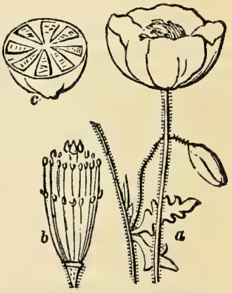


Fig. 175, *a*, Rœmeria *refracta*; *b*, its stamens and pistil; *c*, a cross section of a ripe capsule.

410. Fumariaceæ, *the Fumitory Tribe.*—*Herbaceous* plants, with brittle stems and a watery juice. *Leaves* alternate, multifid, without stipules. *Sepals* 2, deciduous. *Petals* 4, irregular, cruciate, one or both of the outer gibbous at the base, the two inner cohering at the apex. *Stamens* 6, in two parcels, opposite the outer petals; *anthers* membraneous, the outer of each parcel 1-celled, the middle one 2-celled. *Ovary* free, 1-celled. *Fruit* an achenium, or siliqua. *Seeds* with fleshy albumen; *embryo* small.

Genera.—Diclytra, Adlumia, Corydalis, Fumaria.

411. Cruciferæ, *the Cruciferous Tribe.*—*Herbaceous* plants, with a pungent or acrid watery juice. *Leaves* alternate, with-

out stipules. *Flowers* in racemes or corymbs. *Sepals* 4, deciduous. *Petals* 4, alternating with the sepals, their spreading limbs forming a cross. *Stamens* 6, tetradynamous. *Ovary* superior, with parietal placentæ meeting in the middle and forming a false dissepiment; *stigmas* 2, opposite the placentæ. *Fruit* a silique, or silicle. *Seeds* attached by a funiculus to each side of the placentæ, generally pendulous, without albumen; *embryo* with the cotyledons folded on the radicle.

a. Properties: acrid, stimulant.

Genera.—Siliculosæ—Cochlearia, Alyssum, Lunaria, Draba, Thlaspi, Iberis, Cakile, Isatis, Camelina, Subularia, Lepidium, Coronopus, Platyspetalum, Platyspermum, Crambe, Brassica, Vesicaria, Thysanocarpus. Siliquosæ—Cheiranthus, Barbarea, Arabis, Cardamine, Dentaria, Nasturtium, Turritis, Phœnicaulis, Erysimum, Hesperis, Sysimbrium, Warea, Raphanus, Sinapis.

Fig. 176.

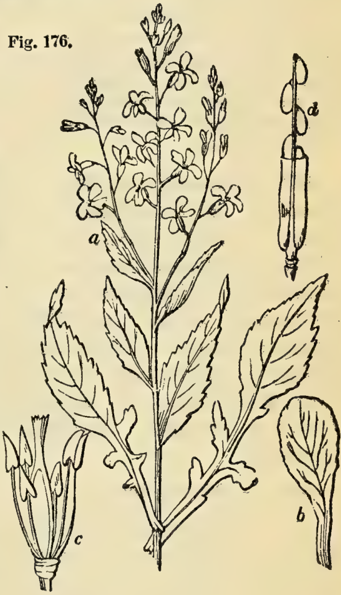


Fig. 176, *a*, Iodanthus *hesperidoides*; *b*, a petal enlarged; *c*, stamens and pistil enlarged; *d*, part of a silique enlarged with a portion of the valves cut away.

412. Capparidaceæ, *the Caper Tribe.—Herbs*, and sometimes *shrubs* or *trees*. *Leaves* alternate, petioled, undivided or palmate. *Sepals* 4–7, more or less cohering at the base. *Petals* 4–7, unequal, usually unguiculate. *Stamens* seldom tetradynamous, usually some high multiple of 4. *Ovary* stalked or sessile, 1-celled, with two or more parietal placentæ; *ovules* numerous. *Fruit* a 1-celled pod. *Seeds* curved or reniform, destitute of albumen; *embryo* curved.

a. Properties: the roots and herbage, or bark are bitter, nauseous, and sometimes poisonous.

Genera.—Cleome, Gynandropsis, Polanisia, Isomeris.

413. Resedaceæ, *the Mignonette Tribe.—Herbaceous* plants (rarely shrubs), with a watery juice. *Leaves* alternate, with gland-like stipules. *Flowers* in terminal racemes, often fragrant. *Calyx* 4–7-parted. *Petals* 2–7, unequal, lacerated, with broad, nectariferous claws. *Stamens* definite, inserted into the disk. *Ovary* sessile, 3-lobed, with 3–6 parietal placentæ; *stigmas* 3. *Fruit* a 1-celled pod. *Seeds* several, exalbuminous; *embryo* curved.

Genus.—Reseda.

414. Violaceæ, *the Violet Tribe.—Herbs*, sometimes *shrubs*.

Leaves simple, alternate, stipulate. *Sepals* 5, persistent, usually elongated at the base. *Petals* 5, unequal, one of them larger than the others, and commonly bearing a spur or sac at the base; æstivation imbricate. *Stamens* 5, alternate with the petals; *anthers* introrse, often cohering. *Ovary* 1-celled, many-seeded; *style* usually turned to one side, with an oblique hooded *stigma*. *Fruit* a 3-valved capsule, placentæ on the middle of the valves. *Seeds* several or numerous; *embryo* straight, in the axis of a fleshy albumen.

a. Properties: some species of this order are cultivated for the beauty of their flowers, others for their fragrance. The roots of all are acrid.

Genera.—Viola, Solea.

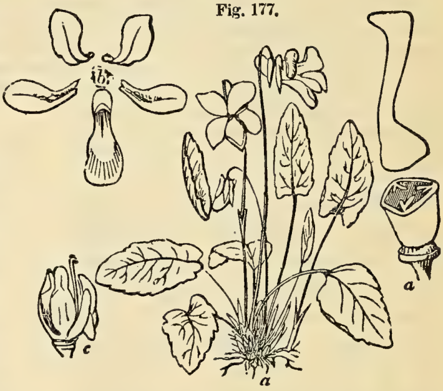


Fig. 177.

Fig. 177, *a*, Viola *sagitta*; *b*, the petals displayed; *c*, stamens in place but separated, and pistil enlarged; *d*, the pistil magnified, the ovary transversely divided.

415. Droseraceæ, *the Sundew Tribe.*—Small *herbs*, usually growing in marshy places. *Leaves* alternate, or clustered at the base of the scape, with a circinate vernation; stipules in the form of fringes. *Sepals* 5, persistent, imbricate in æstivation. *Petals* 5. *Stamens* distinct, as many as the petals and alternate with them, or 2, 3, or 4 times as many. *Ovary* single. *Fruit* a capsule. *Seeds* numerous; *embryo* minute, in fleshy albumen.

Genera.—Drosera, Dionea.

416. Cistaceæ, *the Rock-Rose Tribe.*—*Shrubby* plants, or *herbs*. *Leaves* entire, opposite or alternate. *Sepals* 5, persistent, the three inner convolute in æstivation, the two outer small or sometimes wanting. *Petals* 5 (rarely 3), convolute in æstivation, twisted in the direction opposite to that of the sepals, often crumpled, sometimes wanting. *Stamens* usually numerous, distinct. *Ovary* 1 or many celled. *Fruit* capsular, with parietal placentæ, 3–5–10-valved. *Seeds* few, or numerous, with mealy albumen; *embryo* curved or spiral.

a. Properties: unimportant; the flowers often showy.

Genera.—Cistus. Helianthemum, Hudsonia, Lechea, Ionium.

417. Hypericaceæ, *the St. John's-Wort Tribe.*—*Herbs* or *shrubs*, with a resinous juice. *Leaves* opposite, entire, without stipules, and punctate, with pellucid or blackish dots. *Flowers*

regular. *Sepals* 4 or 5, persistent, the two exterior often smaller. *Petals* 4 or 5, often with black dots, twisted in æstivation. *Stamens* generally polyadelphous. *Carpels* 2–5, united round a central or basal placenta; *styles* the same number as the carpels; *stigmas* capitate or simple. *Fruit* fleshy or capsular. *Seeds* usually indefinite, minute; *embryo* straight; *albumen* little or none.

a. Properties: the plants yield a resinous acid juice, and a bitter balsamic extractive matter.

Genera.—Hypericum, Ascyrum, Elodea, Parnassia.

418. Caryophyllaceæ, *the Pink Tribe.—Herbs*, with opposite, entire *leaves. Flowers* regular, often terminal, sometimes axillary. *Sepals* 4 or 5, distinct, or cohering in a tube. *Petals* 4 or 5, or sometimes wanting. *Stamens* as many as the petals and opposite them, or twice as many. *Ovary* composed of from 2 to 5 carpels; *stigmas* 2–5, sessile, filiform. *Fruit* a capsule opening at the apex. *Seeds* usually indefinite; *embryo* peripheric, curved or coiled round the outside of a mealy albumen

a. Properties: the plants of this order are usually insipid; some are said to be poisonous.

Genera.—Dianthus, Saponaria, Sagina, Arenaria, Stellaria, Cerastium, Silene, Agrostemma, Lychnis, Cucubalus, Mollugo, Frankenia, Polycarpon, Stipulicida, Spergula, Anychia, Scleranthus.

Fig. 178.

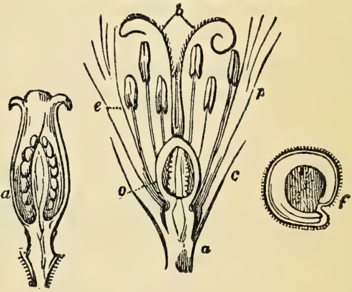


Fig. 178, *a*, section of the flower of Dianthus *caryophyllus*; *s*, stigmas which are papillose along their inner surface; *e*, stamens; *p*, petals cohering with the stamens at their base; *o*, the ovary with central placenta and ovules; *c a*, capsules of Lychnis *githago* cut vertically; *f*, the seed cut vertically, showing the peripherical embryo surrounding the mealy albumen.

419. Portulacaceæ, *the Purslane Tribe.*—Succulent or fleshy *herbs*, or *shrubs. Leaves* alternate or opposite, entire, without stipules, often having hairs in their axils. *Sepals* 2, cohering at the base. *Petals* 5, distinct, or cohering in a short tube. *Stamens* variable in number, sometimes as many as the petals, and opposite them. *Ovary* 1-celled, formed by 3 united carpels. *Fruit* capsular. *Seeds* few or numerous, attached to a central placenta; *albumen* farinaceous; *embryo* peripherical.

a. Properties: insipid, or slightly bitter.

Genera.—Portulaca, Talinum, Calandrinia, Claytonia, Montia, Lewisia.

420. Mesembryanthemaceæ, *the Ice-plant Tribe.—Herbaceous* or *shrubby* succulent plants. *Leaves* simple, opposite or alternate. *Sepals* usually 5, but varying from 4–8, more or less

combined at the base. *Petals* indefinite, colored, sometimes wanting. *Stamens* indefinite, distinct. *Ovary* many-celled; *stigmas* numerous. *Fruit* a many-celled, many-seeded capsule; *embryo* curved or spiral on the outside of mealy albumen.

GENERA.—Mesembryanthemum, Sesuvium.

421. MALVACEÆ, *the Mallow Tribe.—Herbs, shrubs*, or *trees. Leaves* alternate, stipuled. *Flowers* regular, generally showy. *Sepals* 5, more or less cohering at the base, with a valvate æstivation, often bearing an external calyx or involucel. *Petals* as many as the sepals, convolute in æstivation. *Stamens* indefinite, monadelphous, inserted with the petals. *Ovary* formed by the union of several carpels round a common axis, distinct or cohering; *styles* as many as the carpels. *Fruit* capsular or baccate. *Seeds* with little albumen or none; *embryo* large, with foliaceous cotyledons, variously incurved or folded.

a. Properties: plants of this order commonly abound in mucilage; they are destitute of all unwholesome qualities. The inner bark of some species is employed for cordage; cotton is the hairy covering of the seeds of Gossypium.

GENERA.—Malope, Malva, Lavatera, Althea, Hibiscus, Malvaviscus, Gossypium, Abutilon, Hopea, Nuttallia.

Fig. 179.

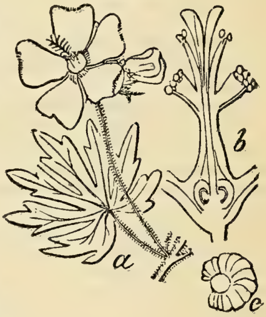


Fig. 179, *a*, flower of a malvaceous plant; *b*, vertical section of the staminal column and of the ovary; *c*, a side view of a detached carpel.

422. TILIACEÆ, *the Linden Tribe.—Trees* or *shrubby* plants. *Leaves* alternate, furnished with deciduous stipules. *Flowers* small. *Sepals* 4–5, with a valvate æstivation, deciduous. *Petals* 4–5, sometimes imbricate in æstivation. *Stamens* indefinite, often in 3–5 clusters distinct or somewhat united. *Disk* glandular. *Ovary* solitary, formed by the union of 2–10 carpels. *Fruit* dry or pulpy, 2–5-celled, or by obliteration 1-celled when ripe. *Seeds* 1 or numerous; *embryo* erect, in the axis of fleshy albumen; *cotyledons* flat, leafy.

a. Properties: these plants contain mucilage, and many of them furnish excellent materials for cordage.

GENERA.—Tilia, Corchorus.

423. TERNSTROMIACEÆ, *the Tea Tribe.—Trees* or *shrubs*, with a watery juice. *Leaves* alternate, simple, without stipules. *Flowers* large and showy. *Sepals* 3–7, coriaceous, concave; æstivation imbricated. *Petals* 5 or more, imbricated. *Stamens* indefinite, united in one or several parcels at the base; *anthers* versatile or adnate. *Ovary* with several cells. *Fruit* a capsule opening by valves, or coriaceous and indehiscent. *Seeds* few

and large, attached to the axis, with or without albumen, *embryo* straight, bent, or folded back.

a. Properties: the leaves of Tea contain a peculiar extractive matter and a somewhat stimulant ethereal oil.
GENERA.—Gordonia, Stuartia, Thea, Camellia, Malachodendron.

424. AURANTIACEÆ, *the Orange Tribe.—Trees* or *shrubs* *Leaves* alternate, compound, destitute of stipules, dotted. *Calyx* short, urceolate or campanulate. *Petals* 3–5, æstivation imbricate. *Stamens* as many as the petals, or some multiple of their number, distinct, or combined in several parcels. *Ovary* free; *style* cylindrical; *stigma* thick. *Fruit* a many-celled berry, with a leathery rind filled with pulp. *Seeds* without albumen.

a. Properties: the rind abounds in a volatile oil, and an aromatic bitter principle.
GENERA.—Citrus, Limonia.

425. MELIACEÆ.—*Trees* or *shrubs*. *Leaves* alternate, usually compound, without stipules. *Sepals* 3–5, more or less united. *Petals* as many as the sepals. *Stamens* twice as many as the petals; *filaments* cohering in a long tube; *anthers* sessile within the orifice of the tube. *Ovary* several-celled; *ovules* 1 or 2 in each cell; *styles* united into one; *stigmas* distinct or combined. *Fruit* a drupe, berry, or capsule. *Seeds* 1 in each cell, destitute of albumen, wingless.

a. Properties: bitter, astringent, and tonic.
GENUS.—Melia.

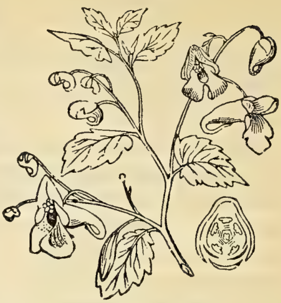
426. CEDRELACEÆ, *the Mahogany Tribe.—Trees* with compact, fragrant, and beautifully-veined wood. *Leaves* alternate, compound, without stipules. *Calyx* 4 or 5 cleft. *Petals* 4–5, with imbricated æstivation. *Stamens* 8–10, united below into a tube, or distinct and inserted into a hypogynous disk. *Ovary* 4–5-celled; *ovules* pendulous; *style* simple; *stigma* peltate. *Fruit* a capsule. *Seeds* winged; *albumen* thin or none; *embryo* straight, erect; *cotyledons* fleshy.

a. Properties: plants of this order are bitter, astringent, tonic, and have an aromatic fragrance.
GENUS.—Swietania.

427. BALSAMINACEÆ, *the Balsam Tribe.—Herbs* with succulent stems. *Leaves* simple, without stipules, opposite or alternate. *Flowers* irregular, axillary. *Sepals* 5, irregular, deciduous, with an imbricated æstivation; the 2 inner and upper connate, colored, the lower or odd sepal spurred or saccate. *Petals* alternate with the sepals, usually 4 in consequence of 1 being abortive; æstivation convolute. *Stamens* 5, cohering by an internal appendage. *Ovary* compound, 5-celled; *stigmas*

sessile. *Fruit* a capsule, bursting elastically by five valves. *Seeds* numerous, destitute of albumen; *embryo* straight.

Fig. 180.



a. Properties: chiefly remarkable for the elastic force with which the valves separate at maturity and expel the seeds.

GENUS.—Impatiens.

Fig. 180, *a*, is a branch both in flower and fruit; *b*, diagram of the flower brought into its true position with respect to the axis, the transverse line underneath showing the position of the bract.

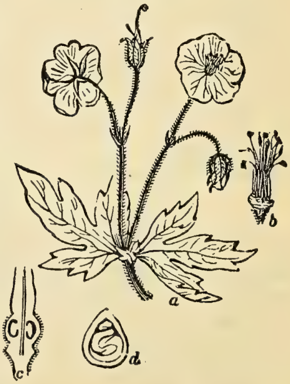
428. TROPÆOLACEÆ, *the Indian Cress Tribe.*—Trailing or twining *herbs. Leaves* alternate, without stipules. *Sepals* 3–5, colored, the lower one spurred. Petals equal or unequal. Stamens 6–10, distinct. *Ovary* composed of 3 or 5 carpels; *ovules* solitary, erect or pendulous. *Fruit* indehiscent, the pieces separable from a common axis. *Seeds* large, destitute of albumen, filling the cell in which they lie; *embryo* large; *cotyledons* large, thick, and consolidated.

a. Properties: some plants of this order produce edible tubers; they possess the same acrid principle and antiscorbutic properties as the Cruciferæ.

GENERA.—1. TROPÆOLÆ—Flowers irregular; ovules pendulous—Tropæolum.
2. LIMNANTHÆ—Flowers regular; ovules erect—Limnanthes, Florkea.

429. GERANIACEÆ, *the Geranium Tribe.*—*Herbaceous* plants or *shrubs. Leaves* simple, either opposite, or alternate with peduncles opposite to them, mostly with stipules. *Sepals* 5, persistent, more or less unequal, æstivation imbricated. *Petals* 5, unguiculate, mostly convolute in æstivation. *Stamens* 10, monadelphous. *Ovary* composed of 5 carpels; *ovules* solitary, pendulous; *styles* 5, cohering round the axis. *Fruit* composed of five 1-seeded carpels, each terminated by an indurated style, which curls from the base upward carrying the pericarp along with it. *Seeds* exalbuminous, with a curved folded *embryo; cotyledons* leafy, convolute, and plaited together.

Fig. 181.



a. Properties: the roots are simply and strongly astringent; the foliage abounds with an aromatic resinous matter and an ethereal oil.

GENERA.—Geranium, Erodium, Pelargonium, Oplotheca.

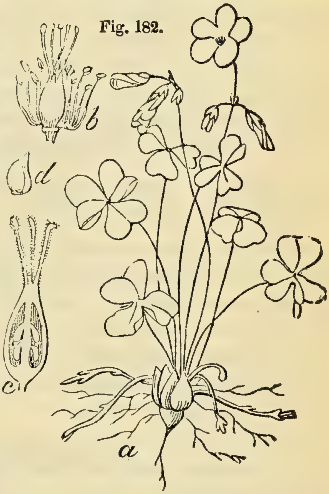
Fig. 181, *a*, GERANIUM *maculatum*; *b*, the calyx and corolla removed, showing the 10 monadelphous stamens and the cohering styles; *c*, vertical section of the base of the pistil and receptacle, magnified; *d*, a transverse section of the seed, showing the leafy convolute cotyledons.

430. Linaceæ, *the Flax Tribe.*—*Herbs* with entire, and sessile *leaves*, usually alternate, and exstipulate. *Sepals* 3–5, persistent with an imbricated æstivation. *Petals* as many as the sepals, with a twisted æstivation. *Stamens* equal in number to the petals, with which they alternate usually with intermediate teeth, or abortive stamens, all united at the base into a hypogynous annular disk. *Ovary* with as many styles and cells as sepals; *stigmas* capitate; *ovules* pendulous. *Fruit* a many-celled capsule, each cell more or less completely divided by a false dissepiment arising from the dorsal suture. *Seeds* single in each spurious cell; *embryo* straight, surrounded by a thin albumen; *cotyledons* flat, fleshy, and oily.

a. Properties: these plants yield mucilage and fiber which are valuable.

Genus.—Linum.

431. Oxalidaceæ, *the Wood-Sorrel Tribe.*—Low *herbs* with alternate, compound *leaves*, generally without stipules. *Sepals* 5, equal, persistent, imbricate in æstivation. *Petals* 5, unguiculate, with a twisted æstivation. *Stamens* 10, monadelphous, in 2 rows, those opposite the petals being longer than those in the outer row. *Carpels* 5, united into a compound ovary; *styles* distinct. *Fruit* a membranaceous, 5-lobed, 5-celled capsule. *Seeds* few, attached to a central placenta; *embryo* large and straight, in thin albumen.



a. Properties: the herbage is sour, and contains oxalic acid. Some plants of this order yield esculent roots.

Genus.—Oxalis.

Fig. 182.

Fig. 182, *a*, Oxalis *violacea*, with the bulb as in summer, producing numerous subterranean branches, and a thickened root below; *b*, the pistil, with the ring of stamens laid open; *c*, vertical section of a pistil, magnified; *d*, an ovule, more magnified.

432. Zygophyllaceæ.—*Herbs*, *shrubs*, or *trees*. *Leaves* opposite, stipuled, usually compound. *Calyx* 4 or 5 parted, convolute in æstivation. *Petals* alternate with the segments of the calyx, imbricated in æstivation. *Ovary* simple, 4 or 5 celled. *Fruit* capsular, with 4 or 5 angles or wings. *Seeds* few, with whitish albumen; *embryo* green; *cotyledons* foliaceous.

Genus.—Tribulus.

433. RUTACEÆ, *the Rue Tribe.*—*Herbs, shrubs,* or *trees. Leaves* opposite or alternate, simple or pinnate, without stipules, covered with pellucid resinous dots. *Flowers* perfect, axillary or terminal, regular or irregular. *Sepals* 4 or 5. *Petals*, the same number as the divisions of the calyx, æstivation usually twisted. *Stamens* as many, or 2 or 3 times as many as the petals, inserted on the outside of a hypogynous disk. *Ovary* sessile or stalked, its lobes equal to the number of petals, or fewer; *styles* united, or separate only at the base. *Fruit* composed of several capsules, which are dehiscent at one or both sutures. *Seeds* few, mostly with albumen; *embryo* curved.

a. Properties: remarkable for strong and unpleasant odor, and bitterness.
GENUS.—Ruta.

434. XANTHOXYLACEÆ, *the Prickly-Ash Tribe.*—*Trees* or *shrubs. Leaves* punctate with pellucid dots, without stipules. *Flowers* polygamous or diœcious. *Sepals* 3–9. *Petals* as many as the sepals, or wanting. *Stamens* equal to the petals in number, or twice as many. *Ovary* made up of 2 or more carpels, combined or distinct; *styles* more or less distinct, according to the degree of cohesion of the carpels. *Fruit* berried or membraneous, 2–5-celled, sometimes consisting of several drupes, or 2-valved capsules. *Seeds* solitary or twin, pendulous, with a smooth and shining crustaceous testa; *embryo* large, lying within fleshy albumen; *cotyledons* ovate, flat.

a. Properties: pungent, aromatic, bitter, and stimulant.
GENERA.—Xanthoxylum, Ptelea.

435. ANACARDIACEÆ, *the Cashew Tribe.*—*Trees* or *shrubs Leaves* alternate, without stipules. *Flowers* small, often polygamous or diœcious. *Sepals* 3–5, united at the base. *Petals* as many as the sepals. *Stamens* equal in number to the petals and alternate with them, or twice as many. *Ovary* one-celled; *ovule* solitary. *Fruit* a berry or drupe. *Seed* destitute of albumen; *embryo* curved.

a. Properties: plants of this order are characterized by an acrid resinous juice used in varnishes; fruit sometimes edible.
GENUS.—Rhus.

436. AMYRIDACEÆ, *the Amyris Tribe.*—*Trees* or *shrubs,* abounding in balsam or resin. *Leaves* alternate or opposite, compound. *Calyx* persistent, regular, with 2 to 5 divisions. *Petals* 3–5. *Stamens* twice as many as the petals. *Disk* orbicular or annular. *Ovary* 1 to 5 celled, sessile. *Fruit* dry, 1–5-celled. *Seeds* exalbuminous; *cotyledons* fleshy or wrinkled.

GENUS.—Amyris.

437. ACERACEÆ, *the Maple Tribe.*—*Trees* with opposite, simple, rarely pinnate *leaves.* *Flowers* often polygamous. *Calyx* divided into 5, occasionally 4–9 parts. *Petals* as many as the lobes of the calyx, inserted round a hypogynous disk, or wanting. *Ovary* free, 2-lobed; *style* 1; *stigmas* 2; *ovules* pendulous, in pairs. *Fruit,* a samara composed of 2-winged carpels, each 1-celled, 1 or 2 seeded. *Seeds* solitary, destitute of albumen. *Embryo* coiled.

a. Properties: useful timber-trees; the sap of A. saccharinum yields sugar.
GENERA.—Acer, Negundo.

Fig. 183.

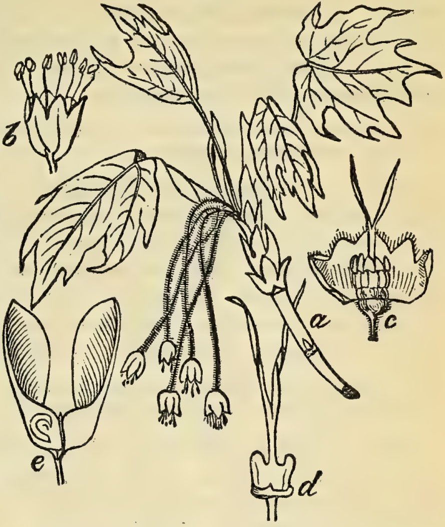


Fig. 183, *a,* ACER *saccharinum* (sugar-maple); branch of a staminate plant in flower *b,* a staminate flower, enlarged; *c,* a pistillate flower with the calyx laid open, showing the short stamens, disk, etc.; *d,* the pistil of the same, the other organs removed; *e,* the fruit, one carpel cut open to show the seed.

438. SAPINDACEÆ, *the Soap-tree Tribe.*—*Trees* or twining *shrubs.* *Leaves* alternate, compound, often marked with lines or pellucid dots. *Flowers* small, irregular. *Sepals* 4 or 5, distinct, or cohering at the base. *Petals* 4–5, occasionally wanting, alternate with the sepals. *Stamens* 8–10. *Ovary* 2 or 3 celled; *ovules* ascending or suspended. *Fruit* a capsule, or samara, or fleshy and indehiscent. *Seeds* usually with an aril, exalbuminous; *embryo* coiled. In this order are included HIPPOCASTANÆ or *Horse-chestnuts.*

a. Properties: sometimes used as a substitute for soap; astringent and bitter.
GENERA.—Cardiospermum, Sapindus, Dodonea, Æsculus.

439. STAPHYLACEÆ, *the Bladder-nut Tribe.*—*Shrubs* with opposite, pinnate leaves. *Sepals* 5, united at the base, colored. *Petals* 5, alternate, æstivation imbricate. *Stamens* 5, alternate with the petals. *Disk* large, urceolate. *Ovary* 2–3-celled; *ovules* usually ascending. *Fruit* membraneous or fleshy. *Seeds* with a bony testa, without albumen; *embryo* straight; *cotyledons* thick.

a. Properties: sub-acrid, or bitter and astringent.
GENUS.—Staphylea.

440. CELASTRACEÆ, *the Spindle-tree Tribe.*—Small *trees* or

shrubs. *Leaves* simple, alternate or opposite. *Sepals* 4 or 5 imbricated. *Petals* 4–5, with a broad base, imbricate in æstivation. *Stamens* alternate with the petals; *anthers* erect. *Disk* large, flat, surrounding and adhering to the *ovary*, which is 2–5-celled. *Fruit* a capsule or berry. *Seeds* sometimes arillate, albuminous; *embryo* straight.

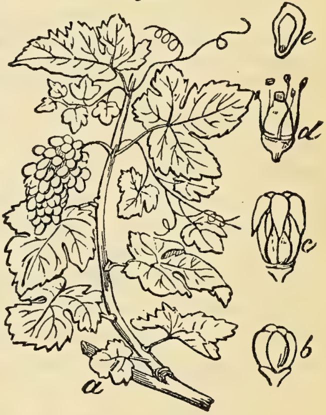
a. Properties: somewhat bitter and acrid, but of little importance in the arts.
Genera.—Celastrus, Euonymus.

441. Rhamnaceæ, *the Buckthorn Tribe.*—*Trees* or *shrubs*, often spiny. *Leaves* mostly alternate, simple. *Flowers* small. *Sepals* 4 or 5, united at the base. *Petals* 4 or 5, inserted into the orifice of the calyx, sometimes wanting. *Stamens* inserted with, and opposite the petals. *Ovary* sometimes cohering with the tube of the calyx; *ovules* solitary, erect. *Fruit* a capsule, berry, or drupe. *Seeds* erect; *embryo* straight.

a. Properties: the herbage and bark are astringent and bitter
Genera.—Zizyphus, Rhamnus, Ceanothus.

442. Vitaceæ, *the Vine Tribe.*—Climbing *shrubs.* *Leaves* opposite, the upper ones alternate. *Flowers* small, often polygamous or diœcious. *Calyx* small, nearly entire. *Petals* 4 or 5, inserted upon the outside of the disk, sometimes cohering by their tips, and caducous. *Stamens* 5, opposite the petals. *Ovary* 2-celled; *ovules* 2 in each cell, erect. *Fruit* a berry. *Seeds* with a bony testa; *embryo* small, in hard albumen.

Fig. 184.



a. Properties: leaves acid, fruit like the common grape.
Genera.—Vitis, Ampelopsis.
Fig. 184, *a*, Vitis *vinifera;* *b*, a flower; *c*, the same casting its petals; *d*, the pistil and stamens; *e*, section of a seed.

443. Polygalaceæ, *the Milkwort Tribe.*—*Herbs* or *shrubs.* *Leaves* simple, pedicels with 3 bracts. *Flowers* small, irregular. *Sepals* 5, irregular. *Petals* 3, more or less united, the anterior larger than the others. *Stamens* 6–8, combined in a tube, which is split on the upper side. *Ovary* compound, 2-celled; *ovule* solitary; *style* curved. *Fruit* usually opening through the valves. *Seeds* pendulous; *embryo* straight, large, in thin, fleshy albumen.

a. Properties: the roots have a milky juice, the leaves are bitter.
Genera.—Polygala, Krameria.

444. Leguminosæ, *the Pea Tribe.*—*Herbs*, *shrubs*, or *trees*. *Leaves* alternate, usually compound, stipulate. *Sepals* 5, more or less united. *Petals* 5, papilionaceous or regular. *Stamens* usually perigynous, distinct, or monadelphous, or diadelphous; *anthers* versatile. *Ovary* usually a single carpel, 1 or many seeded. *Fruit* a legume. *Seeds* exalbuminous; *embryo* straight, or with the radicle bent upon the cotyledons.

a. Characterized by papilionaceous flowers and leguminous fruit; both, ornamental and useful.

Genera.—1. Papilionaceæ—Flowers papilionaceous, the vexillum largest, exterior in æstivation. Baptisia, Pickeringia, Lupinus, Crotolaria, Ulex, Spartium, Genista, Trifolium, Melilotus, Trigonella, Medicago, Indigofera, Psoralea, Amorpha, Dalea, Petalostemon, Glycirrhiza, Galega, Tephrosia, Robinia, Sesbania, Colutea, Astragalus, Oxytropis, Phaca, Cicer, Pisum, Ervum, Vicia, Lathyrus, Astrophia, Orobus, Stylosanthes, Arachis, Coronilla, Zornia, Æschynomene, Desmodium, Lespedeza, Hedysarum, Amphicarpa, Vexillaria, Glycine, Erythrina, Strophostyles, Galactia, Dolichos, Apios, Lupinaster, Sophora, Phaseolus Thermia. 2. Cæsalpinæ—the vexillum interior—Gymnocladus, Pomaria, Cassia, Tamarindus, Cercis, Gleditschia. 3. Mimosæ—Flowers regular, valvate in æstivation—Prosopis, Schrankia, Darlingtonia, Acacia.

Fig. 185.

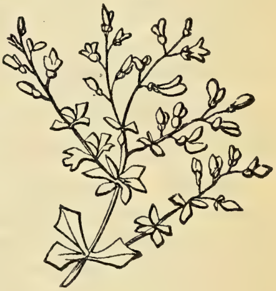


Fig. 185, Baptisia *tinctoria* (wild indigo); *stem* very branching; *leaves* small, bluish-green; *flowers* small, bright yellow, in loose spikes at the end of the branches.

445. Rosaceæ, *the Rose Tribe.*—*Trees*, *shrubs*, or *herbs*. *Leaves* simple or compound, alternate, stipulate. *Sepals* 5 (rarely 3 or 4), more or less united, often with as many bracts. *Petals* as many as the sepals, inserted on the edge of a disk lining the tube of the calyx. *Stamens* indefinite, distinct, perigynous. *Ovaries* solitary, or several. *Seeds* destitute of albumen; *embryo* straight.

a. Properties: fruits important, the bark and root astringent.

Genera.—1. Chrysobalaneæ—Petals and stamens more or less irregular; fruit a drupe; ovary solitary, cohering with the calyx on one side only; style arising from the base—Chrysobalanus. 2. Amygdaleæ—Ovary solitary, free from the calyx; style terminal; fruit a drupe—Amygdalus, Prunus Cerasus, Armeniaca. 3. Roseæ—Ovaries numerous, free from the calyx; fruit either follicles or achenia—Rosa, Dalibarda, Rubus, Fragaria, Potentilla, Sibbaldia, Agrimonia, Purshia, Geum, Sieversia, Dryas, Spirea, Gillenia, Nuttallia, Tigarea, Stylipus. 4. Pomeæ—Ovaries 2–5, cohering with each other and with the fleshy and pulpy calyx tube; fruit a pome—Mespilus, Cratægus, Pyrus, Aronia Sorbus. 5. Sanguisorbeæ—Fruit a nut inclosed in the indurated tube of the calyx; petals none—Sanguisorba, Poterium, Alchemilla, Aphanes.

Fig. 186.

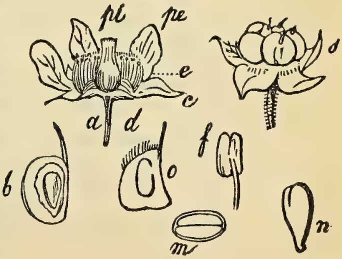


Fig. 186, *a*, flower of Rubus *strigosus* cut vertically; *c*, calyx; *pe*, petals; *e*, stamens; *d*, the disk lining the base of the calyx upon which the stamens are inserted; *pi*, the pistil; *f*, the 2-celled anther with the upper part of the filament; *o*, the ovary cut vertically; *s*, fruit; *b*, vertical section of a carpel; *m*, horizontal section of the exalbuminous seed; *n*, the embryo which fills the entire seed.

446. CALYCANTHACEÆ, *the Calycanthus Tribe.—Shrubs* with quadrangular stems (which exhibit when old 4 axes of growth surrounding the old wood). *Leaves* opposite, without stipules. *Sepals* and *petals* confounded. *Stamens* numerous; *anthers* adnate, extrorse. *Ovaries* indefinite, simple, 1-celled. *Fruit* consisting of achænia, inclosed in the fleshy tube of the calyx. *Seeds* without albumen; *embryo* straight.

GENUS.—Calycanthus.

447. MYRTACEÆ, *the Myrtle Tribe.—Trees* or *shrubs. Leaves* opposite, entire, and dotted, without stipules. *Calyx* adherent to the ovary; *limb* 4 or 5 cleft. *Petals* 4 or 5, or wanting. *Stamens* indefinite; *filaments* long; *anthers* ovate. *Ovary* 1–6-celled; *ovules* pendulous or erect. *Seeds* numerous, without albumen; *embryo* straight or curved.

a. Properties: these plants abound in an aromatic volatile oil and an astringent principle.
GENUS.—Myrtus, Punica.

448. MELASTOMACEÆ, *the Melastoma Tribe.—Trees, shrubs*, or *herbs. Leaves* opposite, ribbed. *Flowers* showy. *Sepals* 4, 5, or 6, more or less united. *Stamens* as many, or twice as many as the petals; *anthers* opening by pores, inflexed in æstivation. *Ovary* adherent to the tube of the calyx. *Fruit* capsular or succulent. *Seeds* attached to central placentae, exalbuminous; *embryo* straight or curved.

a. Properties: the berries of Melastoma are edible.
GENUS.—Rhexia, Melastoma

449. LYTHRACEÆ, *the Loosestrife Tribe.—Herbs* and *shrubs. Leaves* opposite, entire. *Calyx* tubular, lobed; sometimes the lobes have intermediate lobes or teeth. *Petals* inserted into the calyx, alternate with its primary lobes, deciduous. *Stamens* inserted into the tube of the calyx below the petals. *Ovary* 2–4-celled; *styles* united into one. *Fruit* a capsule. *Seeds* numerous, exalbuminous, attached to a central placenta; *embryo* straight.

a. Properties: astringent useful for dyeing
GENERA.—Lythrum, Cuphea, Ammannia, Decodon.

450. RHIZOPHORACEÆ, *the Mangrove Tribe.—Trees* or *shrubs. Leaves* simple, opposite, with inter-petiolary stipules. *Calyx* adherent, 4–12-lobed. *Petals* alternate with the lobes of the calyx. *Stamens* twice or thrice as many as the petals with which they are inserted. *Ovary* 2-celled; *ovules* 2 in each cell,

pendulous. *Fruit* indehiscent, crowned by the adhering calyx. *Seed* solitary, destitute of albumen.

a. Properties: the bark is astringent, used as a febrifuge and for tanning; the fruit is sweet and edible.
GENUS.—Rhizophora.

451. ONAGRACEÆ, *the Evening Primrose Tribe.—Herbs* or *shrubs. Leaves* simple, alternate or opposite. *Calyx* tubular, adherent to the ovary. *Petals* usually 4 (rarely 3 or 6), inserted into the tube of the calyx. *Stamens* as many as the petals, or twice as many; *filaments* distinct; *pollen* triangular, usually cohering by threads. *Ovary* 2–4-celled; *styles* united. *Fruit* capsular or succulent. *Seeds* without albumen; *embryo* straight.

a. Properties: some species yield edible fruits and seeds, many are mucilaginous, a few are astringent.
GENERA.—Jussieu, Ludwigia, Œnothera, Clarkia Epilobium, Fuchsia, Gaura Circæa.

452. SUB-ORDER, HALORAGEÆ.—Aquatic *herbs*, or *undershrubs*, often apetalous. *Seeds* solitary, furnished with little albumen, as in Myriophyllum and Hippuris, where the limb of the calyx is almost wanting; petals none; stamens reduced to a single one; the ovary 1-celled.

GENERA.—Hippuris, Myriophyllum, Serpicula, Proserpinaca.

453. CACTACEÆ, *the Cactus Tribe.*—Succulent *shrubs*, with angular or flattened stems and spinous buds, often leafless. *Flowers* mostly large and showy. *Sepals* numerous, the inner confounded with the petals. *Stamens* indefinite; *filaments* long, cohering at the base with the sepals and petals; *anthers* ovate, versatile. *Ovary* fleshy; *ovules* attached to parietal placentas equal in number to the stigmas; *style* filiform. *Fruit* succulent, 1-celled. *Seeds* numerous, without albumen; *embryo* straight, curved, or spiral.

a. Properties: fruit mucilaginous, eatable.
GENUS.—Cactus.

454. GROSSULACEÆ, *the Currant Tribe.*—Small *shrubs. Leaves* alternate, lobed. *Flowers* in racemes or small clusters. *Calyx*-tube adherent to the ovary, 5-lobed, sometimes colored. *Petals* minute, alternate with the segments of the calyx. *Stamens* 5, inserted on the calyx. *Ovary* 1-celled. *Fruit* a berry, crowned with the remains of the flower. *Seeds* immersed in pulp, and attached to two, opposite, parietal placentas; *albumen* horny; *embryo* straight, minute.

a. Properties: fruits edible, sometimes containing malic acid.
GENUS.—Ribes.

455 LOASACEÆ.—*Herbs*, usually clothed with rigid or sting-

ing hairs. *Leaves* opposite or alternate, exstipulate. *Calyx*-tube adherent to the ovary; *limb* mostly 5-parted. *Petals* the same number, or twice as many as the lobes of the calyx. *Stamens* perigynous, in several rows, distinct or polyadelphous. *Ovary* 1-celled, with parietal placentas; *style* single. *Fruit* capsular or succulent. *Seeds* few, or numerous; *embryo* straight, in the axis of fleshy albumen.

a. Properties: chiefly distinguished for their hair-like stings.
GENUS.—Mentzelia, Bartonia.

456. PASSIFLORACEÆ, *the Passion-flower Tribe.—Herbs* or *shrubs*, climbing by tendrils. *Leaves* alternate, mostly stipulate. *Sepals* 5, united below. *Petals* 5, with a filamentous crown. *Stamens* 5, monadelphous; *anthers* versatile, extrorse. *Ovary* 1-celled; *styles* 3; *stigmas* dilated. *Fruit* mostly fleshy, or berry-like. *Seeds* numerous; *testa* brittle, arilled; *embryo* straight, inclosed in thin, fleshy albumen.

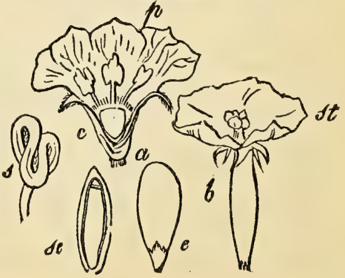
a. Properties: many of the plants yield edible fruits, while others are bitter, astringent, and narcotic.
GENUS.—Passiflora.

457. PAPAYACEÆ, *the Papaw Tribe.—Trees* or *shrubs*, sometimes yielding an acrid milky juice. *Leaves* alternate, lobed. *Calyx* 5-toothed, minute. *Corolla* monopetalous, 5-lobed. *Stamens* 10, inserted on the throat of the corolla; *anthers* introrse. *Ovary* free, 1-celled; *stigma* 5-lobed. *Fruit* succulent or capsular, 1-celled, with parietal placentæ. Seeds enveloped in a loose mucous coat; *embryo* in the axis of fleshy albumen.

GENUS.—Carica.

458. CUCURBITACEÆ, *the Gourd Tribe.*—Juicy *herbs*, climbing by tendrils. *Leaves* alternate, palmate, rough. *Flowers* monœcious or diœcious. *Sepals* 4 or 5, united in a tube. *Petals* as many as the sepals, distinct, or more or less united, cohering with the calyx. *Stamens* 5, attached to the petals, distinct or variously united; *anthers* sinuous. *Ovary* adhering to the calyx, 1-celled, with 3 parietal placentæ, which often project into the cavity, uniting in a central column; *stigmas* thick, velvety or fringed. *Fruit* a fleshy pepo, with a hard rind, and crowned by the scar of the calyx. *Seeds* flat, exalbuminous; *embryo* straight; *cotyledons* foliaceous.

Fig. 187.



a. Properties: an acrid principle abounds; when this is diffused the fruits are edible, but when concentrated, they are poisonous.

GENERA.—Melothria, Momordica, Cucumis, Cucurbita, Sicyos.

Fig. 187, *a*, staminate flower of CUCUMIS *sativus* laid open, showing the stamens attached to the petals, and sinuous anthers; *c*, 5-toothed calyx; *p*, petals united; *s*, stamen separated; *b*, a pistillate flower, with the calyx adherent to the ovary; *st*, stigma; *se*, a seed cut vertically; *e*, the embryo separated.

459. CRASSULACEÆ, *the House-leek Tribe.*—Succulent *herbs* or *shrubs*. *Leaves* entire or pinnatifid. *Flowers* in cymes or racemes, sessile. *Sepals* 3–20, more or less united, persistent. *Petals* as many as the sepals, usually distinct. *Stamens* inserted with the petals and equal to them in number, or twice as many. *Carpels* as many as the petals and opposite to them, sometimes consolidated. *Fruit* consisting of several follicles. *Seeds* variable in number; *embryo* straight, in thin albumen.

GENERA.—Bryophyllum, Sedum, Sempervivum, Penthorum.

460. SAXIFRAGACEÆ, *the Saxifrage Tribe.*—*Herbs* or *shrubs*. *Leaves* alternate or opposite. *Sepals* 4 or 5, more or less united. *Petals* as many as the sepals, or wanting. *Stamens* 5–10, perigynous. *Ovary* usually consisting of 2 carpels, united at the base, distinct at the apex; *stigmas* sessile. *Fruit* capsular, 1 or 2 celled. *Seeds* numerous, minute; *embryo* straight, in fleshy albumen. The three sub-orders are,

1. SAXIFRAGEÆ.—Small herbaceous plants. Petals imbricate in æstivation. Capsule 2-celled, with the placentæ in the axis, or 1-celled, with parietal placentæ.

2. HYDRANGEÆ.—Shrubs. Petals valvate in æstivation. Capsule 2-celled; the styles or stigmas distinct or united. Stamens sometimes numerous.

3. PHILADELPHEÆ.—Shrubs. Petals convolute in æstivation. Capsule 3 or 4 celled; styles more or less united. Stamens usually numerous.

a. Properties: astringent.

GENERA.—1. SAXIFRAGEÆ—Saxifraga, Lepuropetalon, Chrysosplenium, Heuchera, Mitella, Tiarella. 2. HYDRANGEÆ—Hydrangea, Decumaria. 3. PHILADELPHEÆ—Philadelphus, Itea.

Fig. 188.

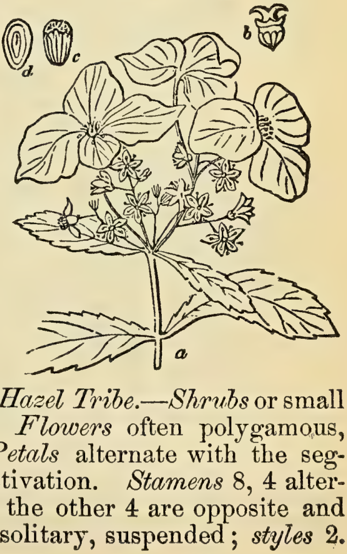


Fig. 188, *a*, HYDRANGEA *virens*; *b*, a seed-vessel of H. hortensis; *c*, its seed; *d*, a section of it.

461. HAMAMELACEÆ, *the Witch-Hazel Tribe.*—*Shrubs* or small *trees*. *Leaves* simple, alternate. *Flowers* often polygamous, axillary. *Calyx* 4 or 5 cleft. *Petals* alternate with the segments of the calyx, valvate in æstivation. *Stamens* 8, 4 alternate with the petals, and fertile; the other 4 are opposite and sterile. *Ovary* adherent; *ovule* solitary, suspended; *styles* 2.

Fruit a 2-celled capsule. *Seeds* pendulous; *embryo* straight, in the axis of fleshy albumen.

a. Properties: the leaves and bark are astringent; the seeds of some species are oily and edible.

GENERA.—Hamamelis, Fothergilla.

462. UMBELLIFERÆ, *the Umbelliferous Tribe.—Herbaceous* plants with solid or fistular, furrowed stems. *Leaves* alternate, variously divided, sheathing at the base. *Flowers* umbellate, involucrate. *Calyx* entire or 5-toothed, cohering with the ovary. *Petals* 5, inserted on the outside of a fleshy, epigynous disk, the points often inflexed, imbricate in æstivation. *Stamens* 5, alternate with the petals, incurved in æstivation. *Ovary* inferior, 2-celled, crowned by a double fleshy disk; *ovules* solitary, pendulous; *styles* 2, distinct. *Fruit* a *cremocarp*, consisting of 2 carpels, which adhere by their face to a common axis, from which they separate and are suspended when ripe; each carpel is traversed by ridges, 5 of which are primary, and 4 alternating with them are secondary; below the channels by which they are separated there are often *vittæ*, containing oil. *Seeds* pendulous; *embryo* minute, at the base of abundant horny albumen.

a. Properties: various. Some umbellifers are esculent, while others are poisonous; nearly all are furnished with a volatile oil or balsam, upon which their aromatic and carminative properties depend.

Fig. 189.

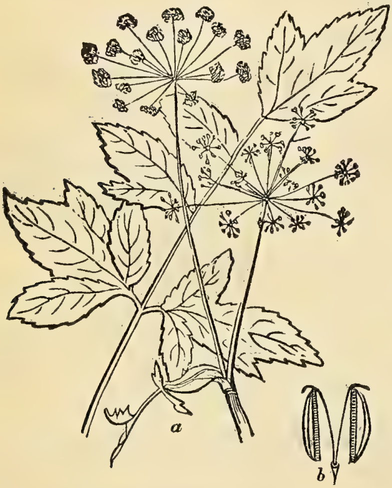
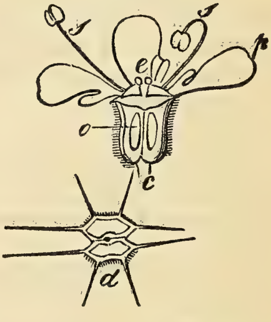


Fig. 190.



GENERA.—Hydrocotyle, Sanicula, Eryngium, Cicuta, Zizia, Apium, Sison, Carum, Cryptotænia, Sium, Bupleurum, Œnanthe, Æthusa, Seseli, Cnidium, Ligusticum, Crithmum, Angelica, Ferula, Peucedanum, Archemora, Anethum, Pastinaca, Heracleum, Trepocarpus, Thaspium, Daucus, Osmorhiza, Conium, Coriandrum, Xanthium.

Fig. 189, *a*, Archengelica *officinalis*; *b*, the ripe fruit. *c*, Fig. 190, vertical section of the flower of Daucus *carota*; *p*, petals, with inflexed points; *s*, stamens, one incurved at the apex; *o*, ovary formed by 2 carpels adherent to the calyx; *e*, styles and stigmas; *d*, horizontal section of the fruit with bristly ridges.

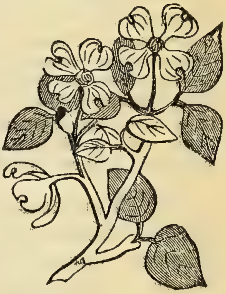
463. Araliaceæ, *the Spikenard Tribe.—Trees*, *shrubs*, or *herbs*, resembling umbelliferous plants in their character. *Calyx* entire or toothed. *Petals* definite, deciduous. *Stamens* as many as the petals, or twice as many. *Ovary* composed of 2 or more carpels, which do not separate, but become drupes or berries. *Seeds* solitary, pendulous; *embryo* small, albumen fleshy.

a. Properties: aromatic and stimulant.

Genera.—Aralia, Panax, Hedera, Adoxa.

464. Cornaceæ, *the Cornel Tribe.—Trees*, *shrubs*, or *herbs*. *Leaves* usually opposite. *Flowers* in cymes, or in heads surrounded by colored involucres. *Calyx* 4-lobed. *Petals* 4, inserted into the upper part of the calycine tube, valvate in æstivation. *Stamens* alternate with the petals. *Ovary* adhering to the tube of the calyx, crowned by a disk. *Fruit* a 2-celled drupe. *Seeds* solitary, pendulous; *embryo* straight, in the axis of fleshy albumen.

Fig. 191.



a. Properties: chiefly remarkable for their bitter and astringent bark.

Genus.—Cornus.

Fig. 191. Cornus *florida* (dogwood); a small *shrub*; *leaves* opposite, petioled; *flowers* terminal, very small, surrounded by a white, showy, four-leaved involucrum; *fruit* oval scarlet drupes.

MONOPETALOUS ORDERS.

465. Caprifoliaceæ, *the Honeysuckle Tribe.—Shrubs* or *herbs*, often twining. *Leaves* opposite. *Flowers* corymbose. *Calyx* superior, limb 4–5-lobed. *Corolla* regular or irregular. *Stamens* inserted on the corolla, equal in number to its lobes and alternate with them. *Ovary* adherent to the tube of the calyx, 2–5-celled. *Fruit* usually a berry or drupe, crowned by the persistent lobes of the calyx. *Seeds* pendulous, albuminous; embryo small. The sub-orders are, *Lonicerœ*, flowers tubular; *Sambucœ*, corolla rotate or urn-shaped.

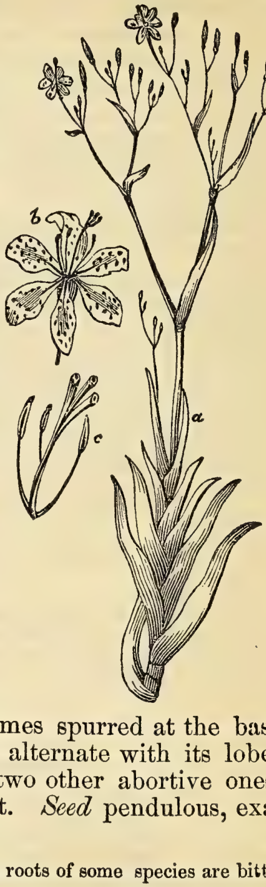
a. The flowers are odoriferous, extensively cultivated for ornament; generally bitter, and rather active or nauseous; the fruit of some species is edible.

Genera.—1. Loniceræ—Linnæa, Symphoria, Diervilla, Lonicera, Xylosteum, Triosteum. 2. Sambucæ—Viburnum, Sambucus.

466. Rubiaceæ, *the Madder Tribe.—Trees*, *shrubs*, or *herbs*. *Leaves* verticillate, or opposite, and furnished with stipules.

Calyx adherent to the ovary, *limb* usually with 4 or 5 divisions, sometimes obsolete. *Corolla* tubular or rotate, with the same number of divisions as the calyx. *Stamens* inserted on the tube of the corolla, alternate with its lobes. *Fruit* various. *Seeds* 1 or many in each cell, albuminous. This order has been subdivided into, 1. *Stellatæ*, with square stems and verticillate leaves. 2. *Cinchonæ*, with rounded stems and opposite leaves furnished with stipules. 3. *Loganiæ*, with opposite, stipulate leaves, and the ovary nearly or entirely free from the calyx.

Fig. 192.



a. Properties: active and generally febrifugal properties prevail: the roots of madder yield an important dye.

GENERA.—1. STELLATÆ—Galium, Rubia. 2. CINCHONÆ—Spermacoce, Diodia, Cephalanthus, Psychotria, Mitchella, Hamiltonia, Hedyotis, Ophiorrhiza, Pinckneya, Houstonia, Chiococea. 3. LOGANIÆ or SPIGELIÆ—Spigelia.

Fig. 192, *a*, GALIUM *circæzans; b*, a flower, enlarged; *c*, stamens and pistil.

467. VALERIANACEÆ, *the Valerian Tribe.—Herbs* with opposite *leaves. Flowers* corymbose, panicled, or in heads. *Calyx* superior, its limb being either membraneous or pappose. *Corolla* 4 or 5 lobed, tubular, sometimes spurred at the base. *Stamens* inserted on the corolla and alternate with its lobes. *Ovary* with one cell, and sometimes two other abortive ones; *ovule* solitary. *Fruit* dry, indehiscent. *Seed* pendulous, exalbuminous; *embryo* straight

a. Properties: strong-scented or aromatic. The roots of some species are bitter tonic, aromatic, antispasmodic, and vermifugal.

GENERA.—Valerianella, Fedia, Plectritis, Valeriana, Phyllactis

468. DIPSACEÆ, *the Teasel Tribe.—Herbs* or *undershrubs. Leaves* opposite or whorled. *Flowers* densely capitate, surrounded by an involucre. *Calyx* adherent, membraneous, resembling pappus. *Corolla* tubular, inserted in the calyx; *limb* oblique, 4 or 5 lobed. *Stamens* 4, alternate with the lobes of the corolla. *Ovary* 1-celled. *Fruit* dry, indehiscent. *Seed* solitary, pendulous; *embryo* straight, in the axis of fleshy albumen.

GENERA.—Dipsacus, Scabiosa.

469. Compositæ, *the Compositæ* or *Sunflower Tribe.—Herbs* or *shrubs. Leaves* alternate or opposite. *Flowers* (called florets) collected in dense heads upon a common receptacle, surrounded by an involucre, the separate flowers often furnished with bractlets called *paleæ. Calyx* adherent to the ovary, its *limb* obsolete or membraneous, consisting of bristles, paleæ, hairs, or feathers called *pappus. Corolla* regular or irregular. *Stamens* 5, inserted on the tube of the corolla, and alternate with its teeth; *anthers* cohering in a tube. *Ovary* 1-celled, with a single, erect ovule. *Fruit* an achenium. *Seed* solitary, erect, albuminous; *embryo* straight. This extensive but very natural family is divided into four sub-orders, namely: *Cichoraceæ*, having the florets all ligulate; *Cinarocephalæ*, florets all tubular; *Corymbiferæ*, florets tubular in the disk, ligulate in the circumference; *Labiatifloræ*, corolla of the disk-flowers bilabiate.

a. Properties: all have more or less bitterness, sometimes associated with astringent, acrid, and narcotic qualities.

470. Sub-order I.—Cichoraceæ—Most plants of this section yield a milky juice, which is bitter, astringent, and narcotic; by cultivation some are rendered esculent.

Genera.—Apogon, Cichorium, Krigia, Troximon, Leontodon, Tragopogon, Prenanthes, Lactuca, Chondrilla, Hieracium, Apargia, Ammobium.

471. Sub-order II.—Cinarocephalæ—Usually tonic and stimulant; bitterness lessened by cultivation, so that the plants often become esculent.

Genera.—Echinops, Arctium, Centaurea, Cnicus, Carthamus, Cynara, Carduus, Onopordon.

472. Sub-order III.—Corymbiferæ—The plants of this section have the general bitterness of the order, and some have an aromatic odor from the presence of volatile oil.

Fig. 193.

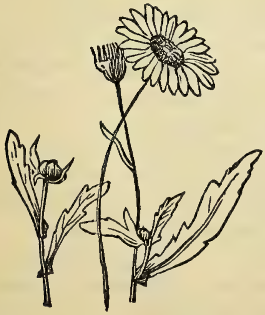
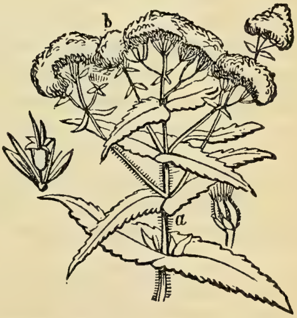


Fig. 194.



GENERA.—Sparganophorus, Vernonia, Stokesia, Elephantopus, Pectis, Ageratum, Stevia, Kuhnia, Liatris, Eupatorium, Mikania, Brickellia, Tussilago, Aster, Erigeron, Boltonia, Bellis, Chrysopsis, Solidago, Chrysocoma, Conyza, Baccharis, Pterocaulon, Inula, Eclipta, Dahlia, Siegesbeckia, Chrysogonum, Silphium, Ambrosia, Polymnia, Iva, Parthenium, Zinnia, Heliopsis, Rudbeckia, Coreopsis, Actinomeris, Helianthus, Bidens, Verbesina, Tagetes, Leptopoda, Tricophyllum, Polypteris, Galardia, Helenium, Marshallia, Anthemis, Achillea, Santolina, Matricaria, Artemisia, Tanacetum, Gymnostyles, Gnaphalium, Cineraria, Arnica, Cacalia, Senecio, Calendula, Melananthera, Sonchus.

Fig. 193. CHRYSANTHEMUM *leucanthemum.*

Fig. 194. EUPATORIUM *perfoliatum: a*, stem, upright, branching; *b*, inflorescence a dense, depressed corymb; florets tubular, white.

473. LOBELIACEÆ, *the Lobelia Tribe.—Herbs* or *shrubs* with milky juice. *Leaves* alternate. *Calyx* 5-lobed. *Corolla* irregularly 5-lobed, usually appearing bilabiate, cleft on one side nearly or quite to the base. *Stamens* 5; *anthers* coherent into a tube. *Ovary* inferior; *stigma* fringed. *Fruit* capsular, 2 or 3 celled. *Seeds* numerous; *embryo* straight, in fleshy albumen.

a. Properties: narcotic, acrid poisons.

GENERA.—Lobelia, Clintonia.

474. CAMPANULACEÆ, *the Bell-flower Tribe.—Herbs* or *undershrubs*, with milky juice. *Leaves* alternate, simple, or deeply divided. *Flowers* usually showy. *Calyx* usually 5-lobed, persistent. *Corolla* regular, campanulate, usually 5-lobed, withering. *Stamens* 5, alternate with the lobes of the corolla. *Ovary* inferior; *style* covered with hairs; *stigma* naked. *Fruit* a capsule, 2 to several celled. *Seeds* numerous, albuminous.

GENUS.—Campanula.

475. ERICACEÆ, *the Heath Tribe.—Shrubs*, or sometimes *herbs*. *Leaves* often evergreen, rigid, entire, verticillate or opposite. *Calyx* 4–5-cleft, nearly equal, persistent. *Corolla* 4–5-cleft, sometimes the petals are distinct. *Stamens* as many, or twice as many, as the segments of the corolla with which they are inserted; *anthers* 2-celled, often appendaged. *Ovary* free or adherent; *styles* and *stigmas* scarcely distinct. *Fruit* capsular or baccate, many-celled. *Seeds* numerous, albuminous; *embryo* cylindrical. This order has been divided into 1, *Vacciniæ* (the Whortleberry Tribe); 2, *Ericinæ* (the proper Heath Tribe); 3, *Rhododendræ* (the Rosebay Tribe); 4, *Pyrolæ* (the Pyrola Tribe); 5, *Monotropæ* (the Indian-Pipe Tribe).

GENERA.—1. VACCINIÆ—Oxycoccus, Vaccinium. 2. ERICINÆ—Erica, Menziesia, Andromeda, Clethra, Epigæa, Gaultheria, Arbutus. 3. RHODODENDRÆ—Azalea, Kalmia, Rhododendron, Rhodora, Bejaria, Ledum, Leiophyllum. 4. PYROLÆ—Chimaphila Pyrola, Galax. 5. MONOTROPÆ—Monotropa, Pterospora, Monotropsis.

476. AQUIFOLIACEÆ, *the Holly Tribe.—Trees* or *shrubs*.

Leaves alternate or opposite, coriaceous. *Sepals* 4–6, æstivation imbricated. *Corolla* 4–6-parted. *Stamens* inserted upon the corolla equal in number to its segments and alternate with them; *filaments* erect; *anthers* adnate. *Ovary* 2–6-celled; *ovules* solitary, pendulous. *Fruit* drupaceous, with 2–6 stones or nucules. *Seed* suspended; *albumen* hard; *embryo* minute.

a. Properties: astringent and tonic.
GENERA.—Ilex, Prinos, Nemopanthes.

477. EBENACEÆ, *the Ebony Tribe.—Trees* or *shrubs* without milk. *Leaves* alternate, entire, coriaceous. *Inflorescence* axillary; *flowers* polygamous. *Calyx* in 3 to 6 divisions. *Corolla* 3–6-cleft, often pubescent. *Stamens* inserted on the corolla, twice or four times as many as its segments. *Ovary* sessile, several-celled; *style* divided; *stigmas* bifid or simple. *Fruit* a kind of berry. *Seeds* large and bony; *albumen* white and cartilaginous; *embryo* short.

a. Properties: fruit edible when fully ripe; the bark is powerfully astringent.
GENUS.—Diospyros.

Fig. 195.

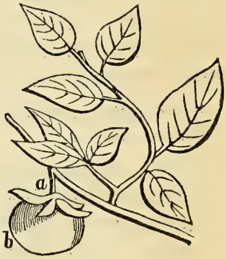


Fig. 195. DIOSPYROS *virginiana: a,* the persistent calyx; *b,* the fruit, which is a yellow berry.

478. STYRACACEÆ, *the Storax Tribe.—Trees* or *shrubs. Leaves* alternate. *Flowers* axillary. *Calyx* persistent. *Corolla* regular, inserted in the calyx. *Stamens* more or less united. *Ovary* cohering more or less with the tube of the calyx. *Fruit* drupaceous, inclosed in the calyx. *Seeds* usually solitary, erect, or suspended; *embryo* slender, in the axis of fleshy albumen.

a. Properties: stimulant, aromatic, and fragrant.
GENERA.—Styrax, Halesia.

479. LYSIMACHIÆ or PRIMULACEÆ, *the Primrose Tribe.—Herbs. Leaves* usually radical, otherwise opposite, whorled, or alternate. *Calyx* 4 or 5 cleft, persistent. *Corolla* regular, usually 5-cleft. *Stamens* inserted on the corolla, equal in number to its lobes and opposite them. *Ovary* 1-celled; *style* 1; *stigma* capitate. *Fruit* capsular, placenta central, distinct. *Seeds* numerous, albuminous; *embryo* transverse.

a. Properties: of little importance except for their beauty; they are cultivated as showy garden annuals, or perennials.
GENERA.—Androsace, Primula, Dodecatheon, Glaux, Lysimachia, Trientalis, Anagallis, Hottonia, Samolus.

480. PLANTAGINACEÆ, *the Plantain Tribe.—Herbaceous* plants, often stemless. *Leaves* radical, ribbed. *Calyx* 4-parted, persistent. *Corolla* tubular or urn-shaped, scarious and persistent; the *limb* 4-cleft. *Stamens* 4, inserted on the corolla, al

ternate with its segments; *filaments* long; *anthers* versatile. *Ovary* free, 2–4-celled; *style* simple, capillary; *stigma* hispid. *Pyxide* 4-celled, many-seeded. *Seeds* sessile, peltate, or erect, solitary, twin, or indefinite; *embryo* in the axis of fleshy albumen.

a. Properties: useful as a pot-herb; emollient.
GENUS.—Plantago.

481. PLUMBAGINACEÆ, *the Leadwort Tribe.*—*Herbs* or *undershrubs.* *Leaves* alternate or clustered, somewhat sheathing at the base. *Calyx* tubular, plaited, persistent. *Corolla* regular; *limb* 5-parted. *Stamens* 5, opposite the petals, hypogynous in the gamopetalous species, in the polypetalous arising from the petals. *Ovary* 1-celled; *ovule* pendulous from a funiculus which arises from the bottom of the cell. *Fruit* a utricle; *embryo* large, in the axis of mealy albumen.

a. Properties: astringent.
GENUS.—Statice.

482. LENTIBULARIACEÆ, *the Butterwort Tribe.*—*Herbs*, growing in water or marshes. *Leaves* radical, sometimes compound, resembling roots, and bearing little air-bladders which render them buoyant. *Flowers* showy, very irregular. *Calyx* divided, persistent, inferior. *Corolla* bilabiate, irregular, usually spurred. *Stamens* 2, inserted into the base of the corolla, and included. *Ovary* free, 1-celled; *placenta* free, central; *ovules* numerous. *Fruit* a capsule. *Seeds* minute, albuminous; *embryo* straight.

GENERA.—Pinguicula, Urtricularia.

483. OROBANCHACEÆ, *the Broom-Rape Tribe.*—*Herbaceous*, leafless plants, parasitic on the roots of other plants. *Stems* covered with brown or colorless scales. *Calyx* inferior, persistent, 4 or 5 toothed, or bilabiate. *Corolla* withering or persistent, irregular, usually bilabiate. *Stamens* 4, didynamous, inserted in the corolla. *Ovary* free, 1-celled, with two parietal placentæ. *Fruit* a capsule inclosed in the persistent corolla. *Seeds* numerous, minute; *embryo* very minute, at one end of fleshy albumen.

a. Properties: astringent, bitter, escharotic.
GENERA.—Epiphegus, Orobanche, Obolaria.

484. GESNERIACEÆ, *the Gesnera Tribe.*—*Herbs* or *shrubs*, frequently springing from scaly tubers. *Leaves* opposite or whorled, rugose. *Flowers* showy, in racemes or panicles, rarely solitary. *Calyx* 5-parted, partially adherent. *Corolla* tubular, 5-lobed, more or less irregular. *Stamens* 2 or 4, didynamous; *anthers* often cohering. *Ovary* partly free, 1-celled. *Disk* surrounding the base of the ovary. *Fruit* 1-celled, succulent or

capsular, with two opposite, parietal placentæ. *Seeds* numerous, minute; *embryo* erect, in the axis of fleshy albumen.

GENUS.—Conradia.

485. BIGNONIACEÆ, *the Trumpet-flower Tribe.—Trees*, *shrubs*, or *herbs*, often twining or climbing. *Leaves* opposite, compound, or occasionally simple. *Calyx* divided or entire, often spathaceous. *Corolla* irregular, 4–5-lobed. *Stamens* 5, unequal, or 4 and didynamous; always 1, sometimes 3 barren stamens *Ovary* 2-celled, with the placentæ in the axis. *Disk* annular, or glandular. *Capsule* 2-celled, 2-valved. *Seeds* numerous, winged, destitute of albumen; *embryo* straight.

GENERA.—Bignonia, Catalpa, Gelseminum.

Sub-order, SESAMÆ—has few and wingless seeds; fruit indurated or drupaceous, often 2 to 4 horned.

GENERA.—Martynia, Sesamum.

486.—ACANTHACEÆ, *the Acanthus Tribe.—Herbs* or *shrubs*. *Leaves* opposite, simple, entire or serrated. *Calyx* in 4–5 divisions, sometimes cut into many pieces, or entire and obsolete, persistent. *Corolla* mostly irregular; *limb* ringent or bilabiate. *Stamens* 2, sometimes 4, didynamous, shorter ones often sterile. *Ovary* seated in a disk, 2-celled, the cells 2 or many seeded. *Fruit* a capsule. *Seeds* usually supported by hooked processes of the placenta, without albumen; *embryo* curved or straight.

GENERA.—Elytraria, Justicia, Ruellia.

487. SCROPHULARIACEÆ, *the Figwort Tribe.—Herbs* or *undershrubs*, sometimes *shrubs*. *Leaves* opposite, whorled, or alternate. *Calyx* inferior, persistent, divided into 4 or 5 parts, unequal. *Corolla* more or less irregular and bilabiate, or personate, æstivation imbricate. *Stamens* usually 4, didynamous, in a single series opposite the sepals. *Ovary* free, 2-celled. *Fruit* capsular. *Seeds* numerous, albuminous; *embryo* straight or slightly curved. This order has been divided into three sections: 1, Salpiglossidæ—Inflorescence centrifugal; æstivation of the corolla plaited or plaited-imbricate; the 2 upper segments external. 2, Antirrhinidæ—Inflorescence centripetal or compound; æstivation of the corolla bilabiately imbricated; the 2 upper segments being external. 3, Rhinanthideæ—Inflorescence centripetal or compound; æstivation quincuncial or irregularly imbricated; one of the lateral segments external, the two upper internal.

a. Properties: acrid and bitter, some species are sedative and poisonous.

GENERA.—1. SALPIGLOSSIDÆ—Salpiglossis. 2. ANTIRRHINÆ—Verbascum, Antirrhinum, Scrophularia, Collinsia, Chelone, Pentstemon, Mimulus, Herpestis, Gratiola, Lindernia, Micranthemum, Hemianthus. 3. RHINANTHIDÆ—Limosella, Capraria, Polypremum, Digitalis, Veronica, Leptandra, Seymeria, Gerardia, Castillya, Euchroma, Orthocarpus, Schwalbia, Bartsia, Euphrasia, Rhinanthus, Pedicularis, Melampyrum, Buchnera.

Fig. 196.

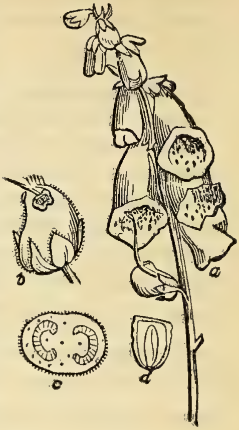


Fig. 196, *a*, DIGITALIS *purpurea:* *b*, a ripe fruit of ANTIRRHINUM *majus;* *c*, a cross section of its ovary; *d*, a section of the seed.

488. VERBENACEÆ, *the Verbena Tribe.*—*Trees* or *shrubs*, sometimes *herbaceous* plants. *Leaves* mostly opposite. *Calyx* tubular, persistent. *Corolla* tubular; *limb* generally irregular. *Stamens* 4, didynamous, sometimes only 2, inserted on the corolla. *Ovary* free, 2–4-celled; *ovules* usually 4, erect or pendulous. *Fruit* nucumentaceous or baccate, composed of 2 or 4 nucules united. *Seeds* 1–4; *albumen* fleshy or wanting; *embryo* straight.

a. Properties: many of the plants are fragrant and aromatic, some are bitter, tonic and astringent, others are acrid.

GENERA.—Verbena, Lantana, Callicarpa, Zapania, Phryma, Avicennia.

489. LABIATÆ, *the Labiate, or Mint Tribe.*—*Herbs* or *under-shrubs* with quadrangular stems. *Leaves* opposite, or sometimes whorled, replete with receptacles of aromatic oil. *Flowers* in nearly sessile, opposite, axillary cymes. *Calyx* tubular, persistent, 5-toothed, 5-cleft, or bilabiate. *Corolla* bilabiate. *Stamens* 4, didynamous, inserted upon the corolla. *Ovary* deeply 4-lobed, the *style* proceeding from the base of the lobes. *Fruit* 1 to 4 small nuts inclosed within the persistent calyx. *Seeds* with little or no albumen; *embryo* erect; *cotyledons* flat.

a. Properties: these plants are generally fragrant and aromatic; none are poisonous or injurious.

GENERA.—Ocimum, Hyptis, Lavandula, Isanthus, Mentha, Lycopus, Salvia, Rosmarinus, Monarda, Pycnanthemum, Tullia, Thymus, Satureja, Hyssopus, Collinsonia, Cunila, Hedeoma, Melissa, Clinopodium, Prunella, Cleonia, Scutellaria, Calamintha, Ceranthera, Nepeta, Glechoma, Dracocephalum, Macbridea, Synandra, Lamium, Leonurus, Galeopsis, Stachys, Marrubium, Ballota, Leucus, Moluccella, Teucrium, Ajuga.

Fig. 197.

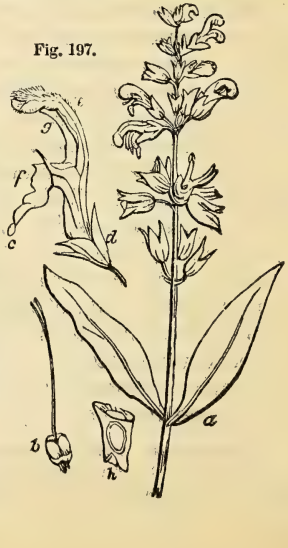


Fig. 197, *a*, SALIVA *officinalis* (sage): *b*, the pistil; *c*, the corolla of Lamium album viewed laterally; *d*, the 5-toothed calyx; *e*, the upper lip formed of two united petals; *f*, the lower lip of three petals; *g*, style; *h*, a carpel cut vertically.

490. BORAGINACEÆ, *the Borage Tribe.*—*Herbs* or *shrubs*, with round stems.

Leaves alternate, rough. *Calyx* 4 or 5 parted, persistent *Corolla* generally regular, 4 or 5 cleft, æstivation imbricated. *Stamens* inserted upon the corolla, and alternate with its lobes. *Ovary* 4-parted, the style proceeding from the base of the lobes. *Fruit* consisting of 2 to 4 distinct achænia. *Seeds* destitute of albumen.

a. Properties: generally mucilaginous and emollient.

GENERA.—Onosmodium, Echium, Pulmonaria, Lithospermum, Batschia, Lycopsis, Anchusa, Myosotis, Symphitum, Borago, Cynoglossum, Rochelia, Heliotropium.

Fig. 198.

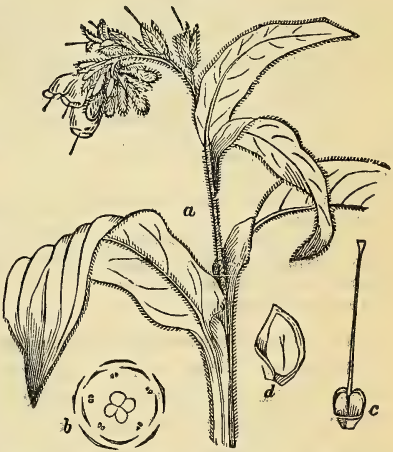


Fig. 198, *a*, SYMPHITUM *officinale:* *b*, a diagram of its flower; *c*, its pistil; *d*, a vertical section of a nut.

491. HYDROPHYLLACEÆ, *the Water-leaf Tribe.—Trees, shrubs*, or *herbs*. *Leaves* alternate, often lobed. *Flowers* in cymose clusters, or 1-sided racemes. *Calyx* deeply 5-cleft, persistent. *Corolla* regular, 5-cleft. *Stamens* 5, inserted into the base of the corolla, alternate with its lobes. *Ovary* free, 1 or 2 celled. *Fruit* capsular, 2-valved, 1–2-celled, with a parietal, or large, central placenta. *Seeds* few, crustaceous; *embryo* in the midst of abundant cartilaginous albumen.

GENERA.—Hydrophyllum, Ellisia, Nemophila, Phacelia, Hydrolea.

492. GENTIANACEÆ, *the Gentian Tribe.—Herbs* with a watery juice. *Leaves* opposite or alternate, entire, sessile. *Flowers* regular, often showy. *Calyx* gamosepalous, usually 4 or 5 divided, persistent. *Corolla* divided into as many lobes as the calyx. *Stamens* inserted upon the tube of the corolla alternate with its lobes. *Ovary* composed of 2 carpels, 1-celled. *Capsule* or berry many-seeded; *embryo* minute, in fleshy albumen. There are two sub-orders:—1. Gentianæ, corolla imbricated, leaves opposite, simple, and entire. 2. Menyantheæ, corolla plaited or induplicate, leaves alternate, and compound or divided.

a. Properties: an intense bitterness pervades all their organs, hence they are used as tonics.

GENERA.—1. GENTIANÆ—Gentiana, Swertia, Frasera, Exacum, Centaurella, Sabbatia, Lisianthus. 2. MENYANTHÆ—Menyanthes, Villarsia.

493. CONVOLVULACEÆ, *the Convolvulus Tribe.*—Twining *herbs*

or *shrubs*, often with milky juice. *Leaves* alternate. *Calyx* persistent, in 5 divisions, much imbricated. *Corolla* regular, deciduous; the *limb* 5-lobed, plaited. *Stamens* 5, inserted into the tube of the corolla, and alternate with its segments. *Ovary* free, 2–4-celled; *styles* united, or more or less distinct. *Fruit* succulent or capsular. *Seeds* with a small quantity of mucilaginous albumen; *embryo* curved; *cotyledons* foliaceous.

a. Properties: the roots contain an acrid milky juice, which is strongly purgative; the C. batatas, or sweet potato, is an important article of food.

GENERA.—Evolvulus, Ipomæa Convolvulus.

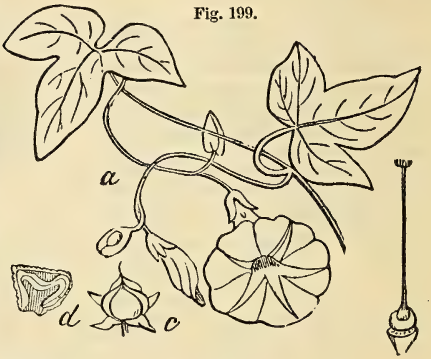


Fig. 199.

Fig. 199, *a*, IPOMÆ *batatoides*; *b*, the pistil and annular disk; *c*, capsule of C. tricolor; *d*, a vertical section of its seed.

Sub-order DICHONDRÆ.—Carpels distinct. Dichondra.

Sub-order CUSCUTINÆ.—Embryo filiform, coiled spirally in fleshy albumen, destitute of cotyledons. Parasitic, leafless, twining herbs destitute of green color. Cuscuta.

494. POLEMONIACEÆ, *the Phlox Tribe*.—*Herbaceous* plants; *stem* occasionally climbing. *Leaves* opposite or alternate. *Calyx* 5-parted, persistent, sometimes irregular. *Corolla* regular, 5-lobed, æstivation convolute. *Stamens* 5, inserted on the corolla alternate with its segments. *Ovary* free, 3-celled; *ovules* few or many; *style* simple; *stigma* trifid. *Fruit* a 3-celled, 3-valved capsule. *Seeds* angular, oval, or winged; *embryo* straight, in fleshy or horny albumen.

GENERA.—Phlox, Polemonium.

495. DIAPENSIACEÆ.—*Prostrate, suffruticose plants*. *Leaves* evergreen, densely imbricated. *Flowers* solitary, terminal. *Sepals* 5, much imbricated, scarcely distinguishable from the bracts which are closely imbricated around it. *Corolla* regular, æstivation imbricated. *Stamens* 5, equal; *filaments* petaloid, arising from the margin of the sinuses of the corolla; *anthers* transversely 2-valved. *Ovary* 3-celled. *Fruit* capsular. *Seeds* many; *embryo* in fleshy albumen.

GENERA.—Diapensia, Pyxidanthera.

496. SOLANACEÆ, *the Potato Tribe*.—*Herbs* or *shrubs*. *Leaves* alternate, the floral ones sometimes double, and crowded. *Inflorescence* variable. *Calyx* 5, seldom 4-parted, persistent, inferior. *Corolla* plaited, or valvate in æstivation;

the *limb* 5-cleft, regular, or somewhat unequal, deciduous. *Stamens* inserted upon the corolla, equal in number to its segments and alternate with them. *Ovary* 2-celled; *ovules* indefinite. *Fruit* either capsular or baccate. *Seeds* indefinite; *embryo* straight or curved, in fleshy albumen.

a. Properties: stimulant and narcotic. The herbage and fruits are mostly deleterious, often violently poisonous; yet the berries of some, as the Egg-plant, Tomato, &c., and the tubers of the Potato, are edible.

GENERA.—Petunia, Nicotiana, Datura, Hyoscyamus, Physalis, Capsicum, Solanum, Androcera, Atropa, Lycium.

Fig. 200.

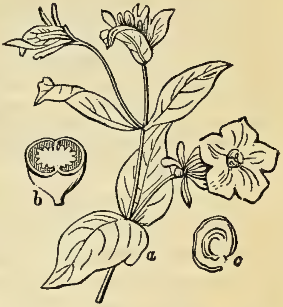


Fig. 200, *a*, PETUNIA *violaceæ*; *b*, a cross section of the ovary; *c*, a section of the seed of SOLANUM *dulcamara*.

497. APOCYNACEÆ, *the Dog-bane Tribe.*—*Trees*, *shrubs*, or *herbs*, with milky juice. *Leaves* opposite, entire, exstipulate. *Calyx* 5-parted, persistent. *Corolla* 5-lobed, twisted in æstivation. *Stamens* 5, inserted on the corolla, alternate with its lobes; *filaments* distinct; *anthers* adhering to the stigma; *pollen* granular. *Ovaries* 2, distinct, or rarely united; *stigma* 1, contracted in the middle. *Fruit* either follicular, capsular, drupaceous, or baccate; either double or single. *Seeds* usually pendulous; *embryo* large and straight, in little albumen.

a. Properties: many plants of this order are poisonous; some are medicinal, and a few are edible.

GENERA.—Vinca, Amsonia, Apocynum, Nerium, Echites.

Fig. 201.

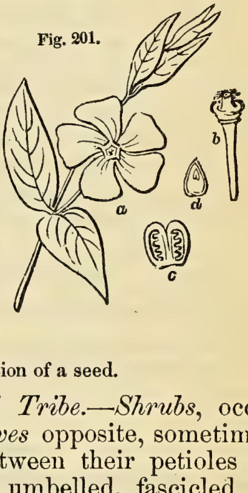


Fig. 201, *a*, VINCA *minor*; *b*, style and stigma; *c*, perpendicular section of the double ovary; *d*, section of a seed.

498. ASCLEPIADACEÆ, *the Milk-weed Tribe.*—*Shrubs*, occasionally *herbs*, with milky juice. *Leaves* opposite, sometimes alternate or whorled, having ciliæ between their petioles in place of stipules. *Flowers* somewhat umbelled, fascicled, or racemose. *Calyx* 5-parted, persistent. *Corolla* regular, 5-lobed, deciduous. *Stamens* inserted into the base of the corolla, alternate with its lobes; *anthers* 2-celled; *pollen* cohering in wax-like masses attached in pairs to 5 glands of the stigma. *Ovaries* 2; *styles* 2, often very short, closely approaching each other; *stigma* common to both styles. *Fruit* consisting of 2 follicles with a placenta on the ventral suture. *Seeds* pendulous, usually with a silky coma; *embryo* straight, in thin albumen.

a. Properties: the juice is generally acrid and stimulating.

Genera.—Periploca, Podostigma, Acerates, Enslenia, Asclepias, Gonolobus, Hoya.

Fig. 202.

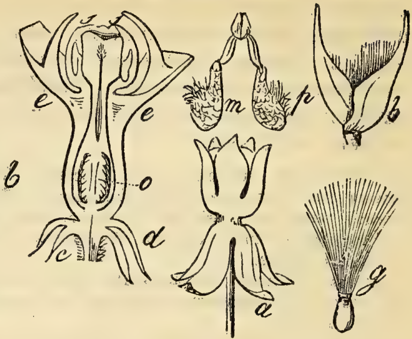


Fig. 202, *a,* flower of Asclepias *nivea; b,* the same cut vertically; *c,* calyx; *d,* corolla; *e e,* coronal appendages; *s s,* stamens; *o,* ovary. Pollen masses *m; p,* pollen grains with tubes beginning to escape from their masses; *f,* fruit at the period of dehiscence; *g,* one of the comose seeds separated.

499. Jasminaceæ, *the Jessamine Tribe.—Shrubs,* often with twining stems. *Leaves* opposite, or alternate, mostly compound. *Flowers* fragrant. *Calyx* with 5 to 8 divisions or teeth, persistent. *Corolla* regular, hypocrateriform, twisted, or valvate, in æstivation. *Stamens* 2, inserted on the corolla, included within the tube. *Ovary* 2-celled; *ovules* 1–4 in each cell. *Fruit* a double berry or capsule. *Seeds* erect, with little or no albumen; *embryo* straight.

a. Properties: flowers fragrant, the leaves and roots sometimes bitter; cultivated for ornament.

Genera.—Jasminum, Nyctanthes.

500. Oleaceæ, *the Olive Tribe.—Trees* or *shrubs. Leaves* opposite, simple, or pinnate. *Calyx* persistent. *Corolla* 4-cleft, or of 4 petals connected in pairs by the filaments, sometimes wanting; valvate in æstivation. *Stamens* 2, alternate with the segments of the corolla. *Ovary* simple, 2-celled; *ovules* pendulous, 2 in each cell. *Fruit* drupaceous, baccate, or capsular. *Seeds* albuminous; *embryo* straight.

a. Properties: bitter, tonic, and astringent. Some plants of this order yield a fixed oil.

Genera.—1. Oleæ—Fruit a drupe or berry: Chionanthus, Olea, Ligustrum. 2. Fraxinæ—Fruit samaroid: Fraxinus, Ornus, Syringa.

APETALOUS ORDERS.

501. Aristolochiaceæ, *the Birthwort Tribe.—Herbs* or climbing *shrubs. Leaves* alternate. *Flowers* brown or some dull color, usually solitary. *Calyx* adherent, tubular, 3-cleft, regular or irregular. *Stamens* 6–12, distinct, or adhering to the style. *Ovary* 3–6-celled. *Fruit* a capsule or berry. *Seeds* numerous; *embryo* minute at the base of fleshy albumen.

a. Properties: tonic and stimulating.

Genera.—Asarum, Aristolochia.

502. Phytolaccaceæ, *the Poke-weed Tribe.—Undershrubs* or

herbs. *Leaves* alternate, entire, often dotted. *Flowers* racemose. *Calyx* 4 or 5 parted. *Stamens* indefinite, or equal in number to the segments of the perianth and alternate with them. *Ovary* consisting of one or several carpels, distinct or combined; *styles* and *stigmas* the same in number as the carpels. *Fruit* baccate, or dry. *Seeds* solitary, erect or ascending; *embryo* straight, or curved round mealy albumen.

a. Properties: acrid and emetic.

GENERA.—Rivina, Phytolacca.

503. CHENOPODIACEÆ, *the Goose-foot Tribe.—Herbs* or *undershrubs. Leaves* usually alternate. *Calyx* persistent, sometimes tubular at the base. *Stamens* inserted into the base of the perianth, opposite its segments and equal to them in number, or fewer. *Ovary* free, 1-celled. *Fruit* membraneous or fleshy. *Seeds* erect or resupinate; *embryo* curved or coiled round farinaceous albumen, or spiral without albumen.

a. Properties: common weeds or sea-side plants; some are used as pot-herbs; a few have esculent roots.

GENERA.—Salicornia, Atriplex, Acnida, Spinacia, Blitum, Beta, Kochia, Chenopodium, Salsola, Corispermum.

504. AMARANTACEÆ, *the Amaranth Tribe.—Herbs* or *shrubs. Leaves* opposite or alternate. *Flowers* in heads or spikes. *Calyx* of 3–5 sepals, scarious, persistent, usually with two bractlets at the base. *Stamens* 5 and opposite the sepals, or some multiple of that number, distinct or united. *Ovary* single, 1 celled. *Fruit* a utricle or caryopsis. *Seeds* pendulous; *embryo* curved around farinaceous albumen.

a. Properties: mucilaginous, emollient.

GENERA.—Philoxerus, Gomphrena, Polycnemum, Achyranthes, Amaranthus, Celosia, Siphonychia.

505. NYCTAGINACEÆ, *the Mirabilis Tribe.—Herbs* or *shrubs. Leaves* usually opposite, often unequal. *Flowers* involucrate. *Calyx* tubular, colored, contracted in the middle, indurated at the base; *limb* entire or toothed, plicate in æstivation, deciduous. *Stamens* 1–20. *Ovary* superior, 1-celled. *Fruit* a caryopsis inclosed within the base of the indurated calyx. *Embryo* coiled round farinaceous albumen.

GENERA.—Boerhaavia, Mirabilis, Allionia.

506. POLYGONACEÆ, *the Buckwheat Tribe.—Herbs. Leaves* alternate, stipules sheathing round the stems above the leaves. *Calyx* free, often colored, imbricated in æstivation. *Stamens* definite, inserted on the bottom of the calyx. *Ovary* free usually formed by the adhesion of three carpels. *Fruit* a nut, usually triangular. *Seeds* erect; *embryo* inverted, generally on one side, rarely in the axis, of farinaceous albumen.

a. Properties: astringent and acid.

GENERA.—Erigonum, Oxyria, Rheum, Polygonum, Calligonum, Rumex, Brunnichia

507. Lauraceæ, *the Laurel Tribe.*—*Trees* or *shrubs. Leaves* alternate, entire. *Calyx* 4–6-cleft, usually in two rows, æstivation imbricated. *Stamens* opposite the segments of the calyx, usually twice their number. *Ovary* superior, 1-celled. *Fruit* baccate or drupaceous. *Seed* destitute of albumen; *embryo* large.

a. Properties: aromatic and fragrant.
Genera.—Laurus, Cinnamonum, Camphora, Sassafras.

508. Thymelaceæ, *the Daphne Tribe.*—*Undershrubs. Leaves* alternate or opposite, entire. *Calyx* inferior, tubular, 4–5-cleft, colored. *Stamens* 8, or equal in number to the segments of the calyx, and opposite them, inserted in the tube. *Ovary* free, 1-celled. *Fruit* nut-like or drupaceous. *Seed* solitary, pendulous, albumen wanting, or thin and fleshy; *embryo* straight.

a. Properties: the bark is acrid and irritant; fruit narcotic.
Genera.—Dirca, Daphne.

Fig. 203.

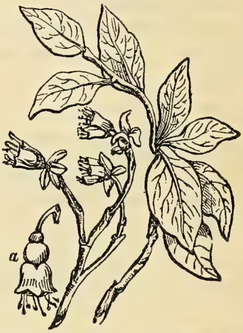


Fig. 203. Dirca *palustris* (leather-wood), a shrub; leaves alternate or scattered, sessile, or nearly so, acute at both ends, unfolding after the flowers; at *a* is a flower magnified, showing the stamens exsert.

509. Eleagnaceæ, *the Oleaster Tribe.*—*Trees* or *shrubs*, covered with scurf. *Leaves* alternate or opposite, entire. *Flowers* usually diœcious. *Calyx* tubular, persistent. *Stamens* 3, 4, or 8, sessile. *Ovary* free, 1-celled. *Fruit* crustaceous, inclosed in the enlarged, succulent calyx. *Seed* erect; *embryo* straight, in thin fleshy albumen.

a. Properties: fruit sometimes edible.
Genera.—Hippophaë, Eleagnus.

510. Santalaceæ, *the Sandal-wood Tribe.*—*Trees* or *shrubs Leaves* alternate, entire. *Flowers* small, rarely diœcious. *Calyx* adherent, 4–5-cleft, valvate in æstivation. *Stamens* 4 or 5, opposite the segments of the calyx, and inserted into their bases. *Ovary* 1-celled; *ovules* 1 to 4, pendulous from the summit of a central placenta. *Fruit* nut-like or drupaceous. *Seed* solitary; *embryo* minute in the axis of fleshy albumen.

a. Properties: some plants of this order are astringent, others yield fragrant wood.
Genus.—Thesium.

511. Nyssaceæ, *the Tupelo Tribe.*—*Trees. Leaves* alternate, entire. *Flowers* diœcious or polygamous. *Calyx* adherent, 5–10-parted. *Stamens* long; *filaments* distinct; *anthers* 2-celled, adnate, introrse. *Ovary* 1–2-celled; *ovules* solitary.

pendulous. *Drupe* baccate. *Seed* solitary; *embryo* large in sparing albumen.

GENUS.—Nyssa.

512. LORANTHACEÆ, *the Mistletoe Tribe.—Shrubs*, usually parasitical. *Leaves* opposite, coriaceous, entire. *Flowers* diœcious. *Sepals* 4–8, distinct or united. *Stamens* as many as the sepals, and opposite them. *Ovary* 1-celled; *ovules* with a naked nucleus. *Fruit* a berry, 1-celled. *Seed* solitary; *embryo* small in the axis of fleshy albumen.

a. Properties: the berries contain a viscid matter like bird-lime; the bark is astringent.
GENUS.—Viscum.

513. ULMACEÆ, *the Elm Tribe.—Trees* or *shrubs. Leaves* alternate, rough, stipules deciduous. *Flowers* in loose clusters. *Calyx* campanulate, 4 or 5 cleft, irregular, imbricated in æstivation. *Stamens* definite, inserted into the base of the calyx. *Ovary* 1 or 2 celled; *ovule* solitary, pendulous. *Fruit* a samara or drupe. *Seed* with little or no albumen; *embryo* straight or curved.

GENERA.—Celtis, Ulmus, Planera.

514. SAURURACEÆ, *the Lizard-tail Tribe.—Herbs* growing in marshy places. *Leaves* alternate, entire, stipulate. *Flowers* growing in spikes, destitute of floral envelopes. *Stamens* definite. *Ovary* consisting of from 3 to 5 more or less united carpels. *Fruit* a capsule or berry. *Seeds* 1 in each cell; *embryo* minute, lying in the persistent embryo-sac at the base of the albumen.

GENUS.—Saururus.

515. PIPERACEÆ, *the Pepper Tribe.—Shrubs* or *herbs*, with articulated stems. *Leaves* opposite or verticillate. *Flowers* spiked or racemose. *Stamens* 2 or more, arranged on one side, or round the ovary. *Ovary* simple, 1-celled; *ovule* solitary, erect. *Fruit* a berry. *Seed* erect; *embryo* lying in a fleshy sac outside the albumen at the apex of the seed.

a. Properties: pungent, aromatic, stimulant.
GENUS.—Piper.

516. CERATOPHYLLACEÆ, *the Hornwort Tribe.*—Aquatic *herbs. Leaves* verticillate, cut into filiform lobes. *Flowers* monœcious. *Calyx* many-parted. *Stamens* indefinite; *anthers* sessile, 2-celled. *Ovary* free, 1-celled; *ovule* solitary, pendulous; *stigma* filiform. *Fruit* a 1-celled nut, terminated by the hardened stigma. *Seed* exalbuminous; *cotyledons* 2 (apparently 4), with a manifest plumule.

GENUS.—Ceratophyllum.

517. Callitrichaceæ, *the Water-Starwort Tribe.*—Small aquatic *herbs. Leaves* opposite, entire. *Flowers* axillary, naked, with a 2-leaved involucre. *Stamen* single, with a slender filament. *Ovary* 4-celled, 4-seeded, indehiscent in fruit. *Seeds* albuminous; *embryo* inverted.

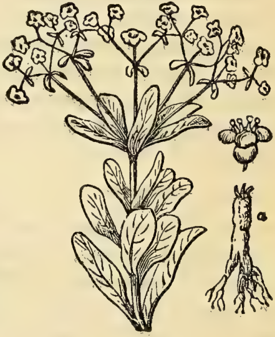
Genus.—Callitriche.

518. Podostemaceæ, *the River-weed Tribe.*—Aquatic *herbs* with the habit of liverworts or mosses. *Leaves* capillary, linear, or irregularly lacerated; or minute and densely imbricated. *Flowers* small, arising from a kind of spatha. *Stamens* definite or indefinite, distinct or monadelphous. *Ovary* 2–3-celled; *ovules* numerous, attached to a fleshy central placenta. *Fruit* a ribbed capsule. *Seeds* numerous, minute, exalbuminous.

Genus.—Podostemum.

519. Euphorbiaceæ, *the Spurge Tribe.*—*Trees*, *shrubs*, or *herbs*, often with a milky juice. *Leaves* simple, opposite or alternate. *Flowers* monœcious or diœcious, axillary or terminal, sometimes inclosed in an involucre. *Calyx* inferior, lobed, or wanting. *Corolla* consisting of petals or scales equal in number to the divisions of the calyx, or wanting. *Ovary* free, 1, 2, 3, or more celled. *Fruit* mostly capsular, the elementary carpels or cocci separating from their common axis. *Seed* suspended; *embryo* inclosed in fleshy albumen.

Fig. 204.



a. Properties: acrid and poisonous.

Genera.—Euphorbia, Stillingia, Tragia, Acalypha, Jatropha, Ricinus, Croton, Buxus, Pachysandra, Phyllanthus.

Fig. 204, Euphorbia *corollata* (spurge ipecacuanha). *Root* very long, yellowish; *stem* simple, erect; *leaves* oblong, obtuse, crowded; *flowers* in a large terminal umbel, rays first trifid, then dichotomous.

520. Empretaceæ, *the Crowberry Tribe.*—Low *shrubs. Leaves* opposite, or somewhat verticillate, evergreen. *Flowers* diœcious or polygamous, in the axils of the uppermost leaves. *Perianth* consisting of persistent, imbricated scales, the innermost often petaloid. *Stamens* 2–3, equal in number to the scales in each row, alternate with the inner. *Ovary* 3–9-celled; *ovules* solitary, ascending. *Fruit* a drupe, with 3–9 bony nucules. *Seeds* albuminous.

Genera.—Empetrum, Ceratiola.

521. Juglandaceæ, *the Walnut Tribe.*—*Trees. Leaves* alter-

nate, pinnate. *Flowers* monœcious. Staminate flowers in aments. *Calyx* adherent to a scale-like bract, irregular, membraneous. *Stamens* indefinite. Pistillate flowers in loose terminal clusters or loose racemes. *Calyx* adherent to the ovary, limb 3–5-parted. *Corolla* usually wanting, sometimes with minute petals. *Ovary* 2–4-celled; *ovule* solitary. *Fruit* drupaceous, endocarp bony. *Seed* erect, without albumen; *embryo* large. *Cotyledons* fleshy, oily, sinuous.

a. Properties: nuts edible, oily; the bark is often acrid.
GENERA.—Juglans, Carya.

522. CUPULIFERÆ, *the Oak Tribe.*—*Trees* or *shrubs.* *Leaves* simple, alternate, often straight-veined, with deciduous stipules. *Flowers* monœcious. Staminate flowers amentaceous. *Calyx* scale-like. *Stamens* 5–20, inserted into the base of the calyx. Pistillate flowers solitary or clustered. *Ovary* surrounded by an involucre which incloses the fruit, or forms a cupule at its base, 2–6-celled, with one or two pendulous ovules in each cell. *Fruit* a 1-celled, 1-seeded nut. *Seeds* exalbuminous; *embryo* large, with fleshy cotyledons.

GENERA.—Carpinus, Ostrya, Corylus, Fagus, Castanea, Quercus.

Fig. 205.

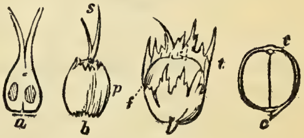


Fig. 205, *a*, Pistillate flower of CORYLUS *avellana* (hazel-nut), cut lengthwise to show the two cells of the ovary, with a pendulous ovule in each; *b*, flower more advanced; *p*, perianth; *s*, styles; *f*, ripe fruit enveloped in its involucre *i*; *c*, seed separated; *t*, integument, half of which is removed to show the exalbuminous embryo.

523. MYRICACEÆ, *the Gale Tribe.*—*Shrubs* or small *trees.* *Leaves* simple, alternate, aromatic, covered with resinous glands and dots. *Flowers* monœcious or diœcious. *Stamens* 2 to 8, generally in the axil of a scale-like bract. *Ovary* 1-celled, surrounded by hypogynous scales; *ovule* solitary, erect. *Fruit* a drupe, often covered with waxy secretions. *Seed* solitary; *embryo* without albumen.

GENERA.—Myrica, Comptonia.

524. BETULACEÆ, *the Birch Tribe.*—*Trees* or *shrubs.* *Leaves* alternate, simple, the primary veins often running straight from the midrib to the margin; stipules deciduous. *Flowers* monœcious, amentaceous, with small scales for their calyx. *Stamens* distinct, opposite the calycine scales. *Ovary* 2-celled; *ovule* solitary, pendulous. *Fruit* membraneous, indehiscent, combined with the scales into a strobile. *Seeds* pendulous, exalbuminous; *embryo* straight.

a. Properties: the bark is sometimes astringent, that of the Birch is aromatic.
GENERA.—Betula, Alnus.

525. SALICACEÆ, *the Willow Tribe.—Trees* or *shrubs. Leaves* alternate, simple, stipulate. *Flowers* diœcious, amentaceous, and destitute of floral envelopes, or with a membraneous cup-like calyx. *Stamens* distinct or monadelphous. *Ovary* 1-celled; *ovules* numerous, erect; *stigmas* 2 or 4. *Fruit* coriaceous, 1-celled. *Seeds* numerous, small, covered with a silky coma, exalbuminous.

a. Properties: the bark is usually astringent and tonic.
GENERA.—Salix, Populus.

526. BALSAMIFLUÆ, *the Sweet-Gum Tribe.—Trees. Leaves* alternate, simple or lobed, stipules deciduous. *Flowers* monœcious, amentaceous. *Catkins* or heads roundish. *Anthers* numerous, nearly sessile, destitute of floral envelopes. *Ovaries* 2-celled, each surrounded by a few scales. *Fruit* a cone composed of hard, connected scales, in the cavities of which lie 2-lobed, 2-celled capsules. *Seeds* numerous, winged, albuminous.

a. Properties: the bark is hot, bitter, and stomachic; a fragrant resin is yielded by several species.
GENUS.—Liquidamber

527. PLATANACEÆ, *the Plane-tree Tribe.—Trees* with a watery juice. *Leaves* alternate, palmate. *Flowers* monœcious, amentaceous, naked. *Catkins* round, pendulous. *Stamens* mixed with small scales. *Ovary* 1-celled; *style* thick, subulate. *Nuts* clavate, compressed. *Seeds* 1–2, pendulous, albuminous.

GENUS.—Platanus.

528. URTICACEÆ, *the Nettle Tribe.—Herbs, shrubs,* or *trees. Leaves* alternate, stipulate, covered with stinging hairs. *Flowers* monœcious, diœcious, or polygamous, scattered, or collected into catkins or heads. *Calyx* membraneous, lobed, persistent. *Stamens* inserted into the base of the calyx opposite its lobes; definite, distinct. *Ovary* superior; *ovule* solitary, erect; *stigma* fringed. *Fruit* an indehiscent nut, surrounded by the membraneous or fleshy calyx. *Embryo* straight, with fleshy albumen.

a. Properties: excessive causticity in the limpid juice is the chief characteristic.
GENERA.—Urtica, Parietaria, Datisca.

Sub-order CANNABINÆ, *the Hemp Tribe.—Seeds* suspended, destitute of albumen; *embryo* hooked or coiled.

GENERA.—Cannabis, Humulus.
Fig. 206, HUMULUS *lupulus* (hop); *a* represents the pistillate flowers forming oval, drooping, and peduncled green cones or strobilums; *stem* twining.

Sub-order MOREÆ, *the Mulberry Tribe.—Seed* solitary, pendulous, albuminous; *embryo* hooked; *juice* milky.

GENERA.—Morus, Broussonetia, Ficus.

Fig. 206.

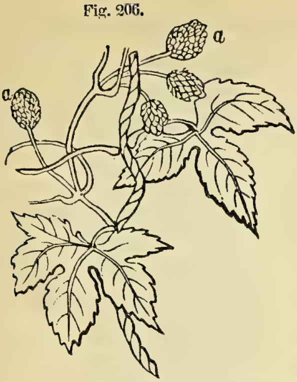
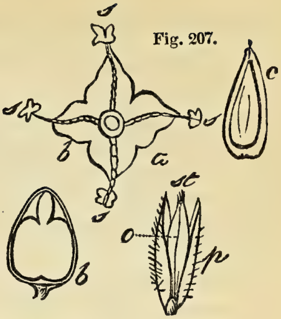


Fig. 207.



Sub-order Artocarpeæ, *the Bread-fruit Tribe.*—*Seed* erect or pendulous, albuminous; *embryo* straight; juice milky.

Genera.—Artocarpus.

Fig. 207, *a*, staminate flower of Urtica *urens* (nettle) expanded; *b*, perianth with 4 divisions; *s*, stamens thrown back by the elasticity of the filaments, with the anthers burst; *p*, pistillate flower, the two outer segments of the perianth very small; *o*, 1-celled ovary; *st*, sessile stigma; *c*, pistil cut vertically to show the direction of the erect ovule; *f*, seed cut perpendicularly to the cotyledons.

Sub-class II.—Gymnospermous, Exogenous Plants.

529. Coniferæ, *the Fir Tribe.*—*Trees* or *shrubs* with branched trunks, abounding in resin, the wood marked with circular disks. *Leaves* linear, lanceolate, or acerose, usually evergreen. *Flowers* monœcious or diœcious, commonly amentaceous. In the *staminate* flowers each floret consists of one or more stamens destitute of calyx or corolla, and arranged upon a common rachis forming a loose ament. *Pistillate* flowers in cones. *Ovary* flat and scale-like; *ovules* in pairs, adherent to the base of the ovary. *Fruit*, a cone formed of scale-shaped ovaries enlarged and indurated. *Integument* of the seed crustaceous; *embryo* in fleshy, oily albumen; *cotyledons* 2, or many.

a. Properties: important timber-trees, furnishing valuable resinous products.

Genera.—1. Abietæ—Pinus. 2. Cupressæ—Juniperus, Thuja, Cupressus. 3. Taxæ—Taxus.

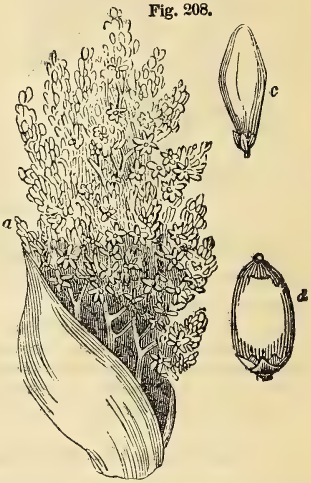
530. Cycadaceæ, *the Cycas Tribe.*—Small *trees* or *shrubs* with simple, cylindrical trunks. *Leaves* pinnate, circinate in vernation. *Flowers* diœcious, terminal, destitute of calyx or corolla. *Staminate* flowers in a strobile or cone. *Pistillate* flowers also in strobiles, or occupying contracted and partly metamorphosed leaves. *Ovules* solitary, naked. *Seeds* hard or spongy-coated nuts.

Genera.—Cycas, Zamia.

Class II.—Endogenous or Monocotyledonous Plants.

531. Palmaceæ, *the Palm Tribe.*—*Trees* with undivided, cylindrical stems which are scaly from the remains of the indurated foot-stalks of the leaves. The *leaves* appear in a terminal tuft, alternate and sheathing, either fan-shaped or pinnate, with plicate vernation. *Flowers* small, perfect or polygamous. *Perianth* 6-parted, in a double row, the three outer ones being smallest. *Stamens* 6; *filaments* often united at the base. *Ovary* 1–3-celled; *ovules* solitary. *Fruit* a berry, or fibrous drupe. *Seeds* with cartilaginous albumen; *embryo* in a small, separate cavity.

Fig. 208.



a. Properties: various; the fruit of some species is edible, while that of others is extremely hard. Many supply oil, wax, starchy matter, sugar, &c. The fibers are used for cordage.

Genera.—Chamærops, Cocos, Sabal.

Fig. 208, *a*, inflorescence of Chamærops *humilis* in its spatha *b*; *c*, an unexpanded flower-bud; *d*, a ripe fruit. (Pl. III., Fig. 3.)

532. Araceæ, *the Arum Tribe.*—*Herbaceous* or *shrubby* plants, with a fleshy corm or rhizoma. *Leaves* petioled, sheathing at the base, with parallel or branching veins. *Inflorescence* a spadix surrounded by a spatha. *Flowers* usually monœcious, destitute of envelopes, or with a single perianth. *Stamens* definite or indefinite; *anthers* extrorse. *Ovary* 1 or several celled. *Fruit* a berry. *Seeds* with or without albumen; *embryo* small.

Properties: acrid and heating.

Genera.—Arum, Calla, Ictodes, Orontium, Acorus, Rensselæria.

533. Typhaceæ, *the Cat-tail Tribe.*—*Herbaceous* plants growing in marshes or ditches. *Leaves* rigid, ensiform, with parallel veins. *Flowers* closely arranged upon a spadix without a spatha. *Sepals* 3 or more, sometimes a mere bundle of hairs. *Stamens* 3 or 6; *filaments* long. *Ovary* single, 1-celled; *ovule* solitary, pendulous. *Fruit* dry. *Seed* adhering to the pericarp; *embryo* in the center of mealy albumen. (See Plate I., Fig. 6.)

Genera.—Typha, Sparganium.

534. Lemnaceæ, *the Duck-weed Tribe.*—*Floating plants* with roots arising from the bottom of a flat frond. *Leaves* or *fronds* very cellular, lenticular, or lobed. *Flowers* produced from the

margin of the frond, inclosed in a spatha without a spadix. *Stamens* 1 or 2. *Ovary* 1-celled; *ovules* 2 or more. *Fruit* membraneous or capsular. (See Plate VIII., Fig. 2.)

GENERA.—Pistia, Lemna.

535. NAIADACEÆ, *the Pond-weed Tribe.*—*Water plants. Leaves* very cellular, with parallel veins. *Flowers* inconspicuous, sometimes perfect. *Perianth* of 2 or 4 pieces, or wanting. *Stamens* definite, hypogynous. *Ovaries* 1 or more; *ovule* solitary. *Fruit* dry, usually indehiscent. *Seed* erect or pendulous, exalbuminous; *embryo* straight or curved.

GENERA.—Potamogeton, Najas, Ruppia, Zostera, Zannichellia.

536. ALISMACEÆ, *the Water-Plantain Tribe.*—*Floating* or *swamp plants*, usually with a creeping, fleshy rhizoma. *Leaves* with parallel veins. *Flowers* regular, perfect, or polygamous, usually in racemes or panicles. *Sepals* 3. *Petals* 3. *Ovaries* superior, several, 1-celled. *Fruit* dry, 1 or 2 seeded. *Seeds* straight or curved, destitute of albumen; *embryo* shaped like a horse-shoe.

a. Properties: some are acrid, others have edible rhizomes.
GENERA.—Alisma, Sagittaria.

537. Sub-order JUNCAGINEÆ. *Seed* and *embryo* straight.

GENERA.—Triglochin Scheuchzeria.

538. HYDROCHARIDACEÆ, *the Frog-bit Tribe.*—*Aquatic herbs. Leaves* parallel-veined, sometimes spiny. *Flowers* diœcious or polygamous, inclosed in a spatha. *Sepals* 3, herbaceous. *Petals* 3. *Stamens* definite or indefinite. *Ovary* adherent, 1 or many celled; *ovules* frequently attached to parietal placentæ. *Fruit* dry or succulent. *Seeds* numerous, exalbuminous; *embryo* straight.

GENERA.—Udora, Vallisneria, Hydrocharis.

539. BURMANNIACEÆ.—*Herbs* with radical leaves. *Perianth* colored, tubular, 6-cleft, the three outer (calyx) sometimes keeled at the back, the 3 inner (petals) minute. *Stamens* 3, opposite the petals. *Ovary* adherent, 1–3-celled, with 3 placentæ *Fruit* a capsule. *Seeds* innumerable, minute, without albumen

GENUS.—Apteria.

540. ORCHIDACEÆ, *the Orchis Tribe.*—*Herbs* or *shrubs*, with fibrous or tuberous roots. *Stem* simple or wanting. *Leaves* mostly radical, sheathing, cauline ones sessile. *Flowers* irregular, bracted, commonly in a spike, or racemose, or panicled, seldom solitary. *Perianth* 6-parted, 3 divisions external, 3 internal; a lower one in the form of a lip (labellum), often spurred. *Stamens* 3, opposite the sepals, coherent with the *style* (composing the column); *pollen* powdery, or cohering in waxy

masses (pollinia). *Ovary* adherent, 1-celled, with 3 parietal placentæ; *stigma* viscid, oblique. *Fruit* capsular, opening by 3 to 6 valves. *Seeds* numerous, minute; *embryo* solid, fleshy, without albumen.

a. Properties: some are aromatic and fragrant, others are tonic and antispasmodic: the tuberous roots are often filled with a dense glutinous or mucilaginous substance. Cultivated chiefly for their beauty and singularity.

Genera.—Liparis, Microstylis, Malaxis, Calypso, Corallorhiza, Aplectrum, Epidendrum, Cymbidium, Tipularia, Orchis, Platanthera, Habenaria, Listera, Neottia, Pogonia, Triphora, Arethusa, Goodyera, Cypripedium, Cranichis.

Fig. 209.

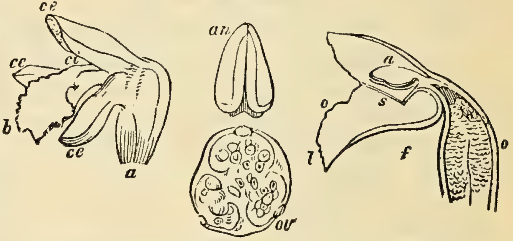


Fig. 209, *a*, flower of Spiranthes *autumnalis* after the ovary has twisted on itself; *o*, ovary with the adherent perianth; *ce*, external, *ci*, internal divisions of the perianth; *l*, labellum or lip, being the lower of the three inner segments; *f*, flower cut vertically; *s*, stigma; *a*, anther; *an*, anther separated, its inner surface shown with its two cells; *ov*, horizontal section of the ovary with 3 parietal placentæ bearing numerous ovules.

Fig. 210.

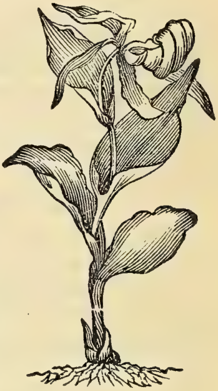


Fig. 210, Cypripedium *pubescens* (yellow lady's-slipper): *roots* fibrous and fasciculated; *stem* simple, erect; *leaves* alternate, sessile, sheathing, oval or oblong, entire, parallel-veined; *flower* sessile, with bracts.

541. Zingiberaceæ, *the Ginger Tribe.*—Aromatic, tropical *herbs*, with a creeping *rhizome*. *Stem* formed of the cohering bases of the leaves. *Leaves* simple, sheathing, with parallel veins proceeding from the midrib to the margin. *Flowers* arising from among membraneous, spathaceous bracts. *Calyx* tubular, 3-lobed, short. *Corolla* tubular, irregular, 6-parted, the segments in two whorls. *Stamens* 3, distinct, of which the two lateral are abortive; *filament* often extending beyond the anther in the form of a lobed or entire appendage; *anther* 2-celled, its lobes often embracing the upper part of the style. *Ovary* 3-celled; *style* filiform; *stigma* dilated, hollow. *Fruit* a 3-celled capsule or berry. *Seeds* roundish or angular; *embryo* inclosed in a little sac (vitellus) at the extremity of farinaceous albumen.

a. Properties: aromatic and stimulant.

Genera.—Zingiber, Curcuma.

542. Cannaceæ, *the Arrow-root Tribe.*—*Herbaceous* tropical plants destitute of aroma, with tuberous rhizomes. *Stem* often

branching. *Leaves*, *inflorescence*, and *flowers* as in Zingiberaceæ. *Stamens* 3, petaloid, one of the laterals and the intermediate one sterile, and one lateral fertile; *filament* entire, or 2-lobed; *anther* on the margin of the filament. *Ovary* 1–3-celled; *ovules* solitary, erect, or numerous, and attached to the axis of each cell; *style* petaloid, or swollen; *stigma* the naked apex of the style, or hollow, hooded, and incurved. *Fruit* capsular. *Seeds* round; *embryo* straight, in hard, somewhat floury albumen. (See Plate III., Fig. 4.)

a. Properties: the roots or rhizomes abound in starch.
GENERA.—Thalia, Canna.

543. MUSACEÆ, *the Banana Tribe.*—Stemless or nearly stemless plants. *Leaves* sheathing at the base forming a spurious stem, often very large, with fine parallel veins at right-angles with the midrib. *Flowers* spathaceous. *Perianth* adherent, 6-parted, petaloid, more or less irregular, in 2 whorls. *Stamens* 6, inserted on the middle of the divisions of the perianth. *Ovary* inferior, 3-celled; *ovules* numerous; *style* simple; *stigma* 3-lobed. *Fruit* capsular or succulent. *Seeds* sometimes surrounded by hairs; *testa* usually crustaceous; *embryo* erect in the axis of mealy albumen. (See Plate I., Fig. 4.)

a. Properties: valuable for the abundance of nutritive food afforded by the fruit, and for the many domestic purposes to which the leaves of some species are applied.
GENERA.—Musa.

544. AMARYLLIDACEÆ, *the Amaryllis Tribe.*—*Bulbous* plants; *roots* sometimes fibrous. *Leaves* sessile, elongated, alternate, radical leaves sheathing. *Flowers* with spathas; panicled, corymbed, or solitary. *Perianth* 6-parted. *Stamens* 6, inserted into the tube of the perianth; *anthers* introrse. *Ovary* 3-celled; *style* 1; *stigma* simple or 3-parted. *Fruit* a 3-celled, 3-valved capsule, or berry. *Seeds* with a fleshy albumen; *embryo* nearly straight. This family has been divided into 4 tribes, or sub-orders: 1, Amaryllæ, bulbs, flowers without a corona; 2, Narcissæ, bulbs, flowers with a corona; 3, Alstromeriæ, fibrous roots, sepals different in form from the petals; 4, Agaveæ, roots fibrous; sepals and petals alike. (See Plate VI., Fig. 2.)

a. Properties. the bulbs of many species have narcotic poisonous qualities.
GENERA.—1. AMARYLLÆ—Galanthus, Amaryllis, Crinum. 2. NARCISSÆ—Pancratium, Narcissus, Hypoxis. 3. AGAVEÆ—Agave.

545. BROMELIACEÆ, *the Pine-apple Tribe.*—Stemless or short-stemmed plants. *Leaves* radical, ensiform, channeled, often covered with scales, and spiny at the edge or point. *Perianth* tubular, 6-parted, in 2 whorls. *Calyx* persistent, more or less adherent to the ovary. *Petals* 3, colored, withering or decidu-

ous, imbricated in æstivation. *Stamens* 6, inserted into the tube of the perianth; *anthers* introrse. *Ovary* 3-celled; *style* single; *stigma* 3-lobed or entire, often twisted. *Fruit* capsular or succulent, 3-celled. *Seeds* numerous, albuminous; *embryo* minute. (See Plate V., Fig. 3.)

a. Properties: fruit more or less acid in the wild state, but when cultivated it becomes sweet and highly aromatic.

Genera.—Bromelia, Tillandsia.

546. Hæmodoraceæ, *the Blood-root Tribe.*—*Herbaceous* plants with fibrous roots. *Leaves* equitant, distichous, ensiform, and with the stems and flowers more or less woolly. *Perianth* petaloid, 6-cleft, regular. *Stamens* 3 or 6, inserted on the perianth; *anthers* introrse. *Ovary* 3-celled, adherent. *Fruit* a 3-valved capsule. *Seeds* definite or numerous; *embryo* in cartilaginous albumen.

Genera.—Dilatris, Metris.

Fig. 211.

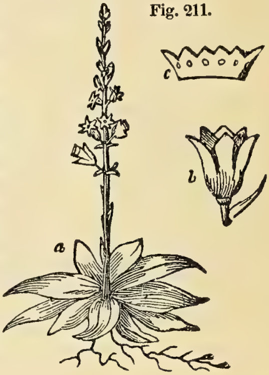


Fig. 211, *a*, Aletris *farinosa; b*, tubular perianth; *c*, the same spread open, showing the stamens.

547. Iridaceæ, *the Iris Tribe.*—*Herbaceous* plants with tuberous or fibrous roots. *Leaves* sessile, alternate, equitant, compressed, ensiform. *Flowers* with spathas. *Perianth* 6-parted, 3 internal, 3 external. *Stamens* 3. *Ovary* 3-celled; *style* 1; *stigmas* 3, often petaloid. *Capsule* 3-celled, 3-valved, many-seeded. *Seeds* numerous; *embryo* inclosed in hard albumen. (See Plate VI., Fig. 6.)

Genera.—Sisyrinchium, Iris, Tigridia, Gladiolus, Ixia, Crocus.

Fig. 212.

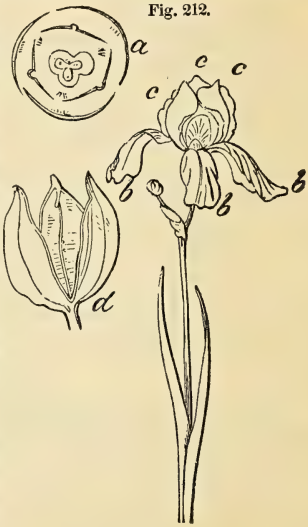


Fig. 212, diagram of an Iris showing the 6 divisions of the perianth; *b*, exterior divisions; *c*, interior divisions of the colored perianth of Iris *germanica; d*, ripe capsule; *e* transverse section of the ovary.

548. Dioscoraceæ, *the Yam Tribe.*—*Twining shrubs* with large tubers. *Leaves* alternate, occasionally opposite, with reticulated veins. *Flowers* inconspicuous, diœcious. *Perianth* adherent to the ovary, 6-parted in 2 series. *Stamens* 6. *Ovary* 3-celled *ovules* 1 or 2 in each cell; *styles* and *stigmas* nearly

distinct. *Fruit* a 3-winged capsule, compressed. *Seeds* compressed; *embryo* small; *albumen* cartilaginous.

a. Properties: acrid. Yams, the tubers of the various species of Dioscorea, are an important article of food in warm countries.
GENUS.—Dioscorea.

549. SMILACEÆ, *the Smilax Tribe.—Herbs* or *undershrubs*, often climbing. *Leaves* reticulate-veined. *Flowers* perfect or diœcious. *Perianth* 6-parted, free. *Stamens* 6, inserted into the base of the perianth. *Ovary* 3-celled; cells 1 or many seeded; *style* usually trifid; *stigmas* 3. *Fruit* a berry, few or many seeded; *embryo* small; *albumen* cartilaginous.

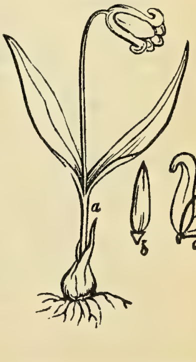
a. Properties: mucilaginous, demulcent.
GENUS.—Smilax.

550. TRILLIACEÆ, *the Trillium Tribe.—Herbs* with simple stems. *Leaves* verticillate. *Flowers* large, terminal, solitary. *Sepals* 3, herbaceous. *Petals* 3, colored or herbaceous; sometimes a fourth is added to their parts. *Stamens* 6, 8, or 10; *filaments* subulate; *anthers* linear, with a prolonged connective. *Ovary* free, 3–5-celled, *styles* as many, distinct. *Fruit* succulent. *Seeds* indefinite; *embryo* minute in fleshy albumen.

a. Properties: acrid, narcotic.
GENERA.—Trillium, Medeola.

551. LILIACEÆ, *the Lily Tribe.—Herbs*, *shrubs*, or *trees*, with bulbs, tubers, rhizomes, or fibrous roots. *Stems* simple, without branches. *Leaves* usually narrow with parallel veins, sheathing or clasping at the base. *Flowers* regular, perfect. *Perianth* colored, mostly of 6 parts, in 2 rows. *Stamens* 6, usually alternate with the segments of the perianth, into which they are inserted; *anthers* introrse. *Ovary* free, 3-celled. *Fruit* succulent, or dry and capsular. *Seeds* numerous, packed one above the other in 1 or 2 rows; *embryo* in the axis of fleshy albumen. (See Plate II., Fig. 1, and Plate I., Fig. 3.)

Fig. 213.



a. Properties: acrid and sometimes bitter. The bulbs abound in starchy or mucilaginous matter. Some are edible when cooked.

GENERA.—1. TULIPEÆ—Erythronium, Tulipa, Calochontus, Fritillaria, Lilium. 2. HEMEROCALLEÆ—Hemerocallis. 3. ALOINEÆ—Aloë, Yucca. 4. SCILLEÆ—Allium, Scilla, Nolina, Brodiæa, Ornithogalum, Hyacinthus. 5. ANTHERICÆ—Phalangium, Asphodelus, Lophiola. 6. ASPARAGEÆ—Asparagus, Dracæna, Convallaria.

Fig. 213, *a*, ERYTHRONIUM *americanum*: *b*, a separate petal; *c*, an internal and external segment of the perianth with a stamen and pistil.

552. PONTEDERIACEÆ, *the Pontederia Tribe.—Aquatic* or

marsh plants. *Leaves* sheathing, parallel-veined. *Flowers* solitary, or spicate, spathaceous. *Perianth* 6-cleft, tubular, colored, circinate in æstivation. *Stamens* 3 or 6, perigynous; *anthers* introrse. *Ovary* free, 3-celled; *ovules* numerous. *Fruit* a capsule. *Seeds* indefinite, attached to a central axis: *embryo* in the axis of mealy albumen.

GENERA.—Heteranthera, Pontederia, Schollera.

553. MELANTHACEÆ, *the Colchicum Tribe.—Bulbous, tuberous,* or *fibrous-rooted* plants. *Leaves* sheathing, parallel-veined. *Perianth* petaloid, in 6 pieces, distinct, or united in a tube. *Stamens* 6; *anthers* extrorse. *Ovary* free, 3-celled; *ovules* numerous. *Fruit* a 3-celled capsule. *Seeds* with a membraneous testa; *embryo* in dense fleshy albumen. This order is subdivided into: 1, Veratræ or Melantheæ, dehiscence of capsule septicidal; rhizome fibrous; 2, Uvularieæ, dehiscence of capsule loculicidal; rhizome bulbous or fibrous; 3 Colchiceæ, dehiscence septicidal; rhizome bulbous.

a. Properties: generally poisonous; many species are acrid, purgative, and emetic, and some are narcotic.

GENERA.—1. MELANTHEÆ—Tofieldia, Pleea, Xerophyllum, Helonias, Veratrum, Melanthium. 2. UVULAREÆ—Uvularia, Streptopus. 3. COLCHICEÆ—Colchicum.

554. JUNCACEÆ, *the Rush Tribe.—Herbaceous* plants, with fascicled or fibrous roots. *Leaves* hollow, grooved, or flat, with parallel veins. *Flowers* small, glumaceous; in clusters, cymes, or heads. *Perianth* 6-parted, in 2 series, generally green or brown. *Stamens* 6, inserted into the base of the segments, or 3 and opposite the external segments. *Ovary* 1 or 3 celled *Fruit* capsular, 3-valved. *Seeds* few or many; *embryo* minute in fleshy albumen. (See Plate VIII., Fig. 7.)

GENERA.—Luzula, Juncus, Narthecium, Zigadenus.

555. COMMELYNACEÆ, *the Spiderwort Tribe.—Herbaceous* plants. *Leaves* flat, narrow, usually sheathing at the base. *Perianth* in 2 verticils, outer 3-parted, herbaceous; inner petaloid, 3-parted, sometimes cohering at the base. *Stamens* usually 6; *anthers* 2-celled, introrse. *Ovary* 2 or 3 celled; *style* 1; *stigma* 1. *Fruit* a capsule. *Seeds* often in pairs; *embryo* small, pulley-shaped, in a cavity of fleshy albumen.

a. Properties: mucilaginous.

GENERA.—Commelyna, Tradescantia.

556. XYRIDACEÆ, *the Xyris Tribe.—Herbaceous,* sedgy plants with fibrous roots. *Leaves* radical, ensiform or filiform, sheathing at the base. *Flowers* in terminal, imbricated, scaly heads. *Perianth* 6-parted, in two whorls, the outer (*calyx*) glumaceous, the inner (*corolla*) petaloid. *Stamens* 6, inserted on the corolla, three of them bearing extrorse anthers, the others mere sterile

filaments. *Ovary* single, 1-celled, with 3 parietal placentæ, or 3-celled. *Fruit* a capsule. *Seeds* numerous; *embryo* on the outside of mealy albumen.

Genus.—Xyris.

557. Eriocaulonaceæ, *the Pipe-wort Tribe.*—Swampy or aquatic *herbs. Leaves* linear, cellular, or fleshy. *Flowers* monœcious or diœcious, very minute, spiked or capitate. *Perianth* glumaceous. *Stamens* definite, when 2 or 3 in number opposite the inner glumes. *Ovary* 3 or 2 celled; *ovules* solitary. *Fruit* a capsule. *Seed* solitary, pendulous; *embryo* lenticular, outside of mealy albumen.

Genus.—Eriocaulon.

558. Cyperaceæ, *the Sedge Tribe.*—*Grass-like herbs* with solid stems, and usually fibrous roots. *Leaves* narrow or taper, and the sheaths entire, (not slit). *Perianth* none, or of a few bristles. *Stamens* usually 3, hypogynous. *Ovary* 1-celled; *styles* 2 or 3, more or less united. *Fruit* an achenium; *embryo* lenticular, inclosed in farinaceous albumen.

Genera.—1. Caricæ—Carex. 2. Sclereæ—Scleria. 3. Rhynchosporeæ—Rhynchospora, Schænus. 4. Scirpeæ—Scirpus. 5. Cypereæ—Cyperus, Kyllingia.

Fig. 214.

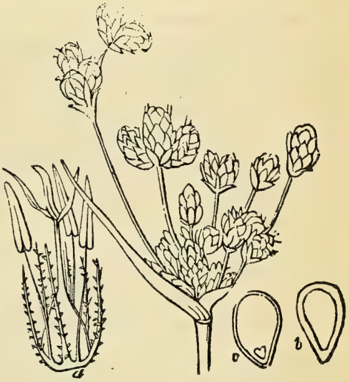


Fig. 214, Scirpus *lacustris: a*, a flower surrounded with bristles; *b*, a seed; *c*, a section of a seed showing the embryo.

559. Graminaceæ, *the Grass Tribe.*—*Herbaceous* plants with cylindrical, hollow, and jointed stems, called *culms. Roots* fibrous and capillary. *Leaves* narrow, alternate, with the sheath split. *Flowers* consisting of imbricated bracts, of which the exterior are called *glumes;* those that immediately inclose each flower, *paleæ. Glumes* usually 2, alternate. *Paleæ* 2, alternate. *Stamens* commonly 3; *anthers* versatile. *Ovary* simple; *styles* 2 or 3; *stigmas* feathery or hairy. *Fruit* a caryopsis; *embryo* small, attached to a farinaceous albumen.

a. Properties: valuable as food for men and animals.

Genera.—1. Oryzeæ—Leersia, Oryza, Hydrochloa, Zizania. 2. Phalareæ—Zea Coix, Alopecurus, Phleum, Phalaris, Holcus. 3. Paniceæ—Paspalum, Millium, Panicum, Pennisetum. 4. Stipeæ—Oryzopsis, Stipa, Aristida. 5. Agrosteæ—Muhlenbergia, Agrostis. 6. Arundineæ—Arundo, Phragmites. 7. Aveneæ—Anthoxanthum, Aira, Avena, Danthonia. 8. Festuceæ—Sesleria, Poa, Briza, Kœleria, Melica, Dactylis, Festuca, Bromus. 9. Hordeæ—Lolium, Triticum, Secale, Elymus, Hordeum. 10. Rotbœlleæ—Nardus, Rotbollia, Tripsacum. 11. Andropogoneæ—Saccharum, Erianthus, Sorghum, Andropogon, Monocera, Mugia.

560 Series II.—Cryptogamous or Flowerless Plants.

Class III.—Acrogenous Plants.

561. Equisetaceæ, *the Horse-tail Tribe.—Leafless* plants. *Stem* simple or branched, striated, hollow, closed and separable at the joints, each of which is surrounded by a membraneous, toothed sheath. *Inflorescence* a dense, cylindric, terminal spike or strobile composed of peltate scales ; *spore-cases* (*thecæ* or *sporangia*) attached to the lower surface of the scales. *Spores* numerous, oval, surrounded by a pair of elastic, clavate *elaters*.

a. Properties: plants of this order abound in silex, and are useful in polishing furniture.

Genus.—Equisetum.

562. Filices, *Ferns.—Stem* a creeping rhizome, or an erect, arborescent trunk. *Leaves* (*fronds*) usually circinate in vernation. *Spore-cases* (*thecæ* or *sporangia*) arising from the veins on the under surface of the fronds, or along the margin. *Thecæ* either stalked, with the pedicel passing round them in the form of an elastic ring, or sessile and destitute of a ring. The three principal sub-orders are: 1. Polypodieæ; thecæ on the back of the frond annulate, bursting irregularly and transversely; spores roundish or oblong. 2. Osmundeæ; sporangia variously collected, destitute of a proper ring, opening lengthwise. 3. Ophioglosseæ; sporangia spiked, distinct, exannulate.

Genera.—1. Polypodeæ—Acrostichum, Polypodium, Adiantum, Pteris, Onoclea, Asplenium, Scolopendrium, Aspidium. 2. Osmundeæ—Osmunda, Lygodium, Schizæa. 3. Ophioglosseæ—Ophioglossum, Botrychium, Hypopeltis.

Fig 215, *a*, part of the leaf of Aspidium *lonchitis ; b*, magnified view of a section of A. *exaltatum*.

Fig. 215.

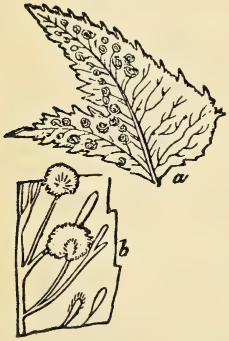


Fig. 216.

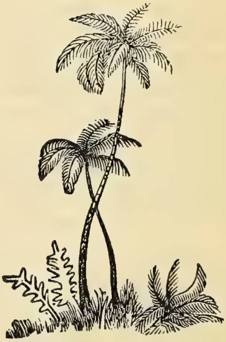


Fig. 216, Alsophila (tree-fern). The tree-ferns are the most gigantic of the Acrogens; their trunks are sometimes forty feet high; in appearance they resemble palms and some other endogenous plants, but in structure they differ; the stem is formed by the union of leaves at their bases, the vessels of which extend upward: the plant therefore grows from its summit, hence the name acrogens (from *akros*, summit). The leaves are terminal, and when young are rolled up in a *circinate* manner peculiar to ferns; the fruit is borne on the margin of contracted leaves, as the spore-cases upon the leaves of Osmunda and other ferns.

563. Lycopodiaceæ, *the Club-Moss Tribe.—Moss-like* plants, with creeping or erect leafy stems. *Leaves* narrow, simple, entire. *Thecæ* sessile in the axils of the leaves, 1–3-celled, opening by valves or indehiscent, containing minute grains like fine powder, or a few sporules; sometimes both kinds are found on the same plant.

a. Properties: some *Lycopodiums* are emetic and cathartic. The powdery matter in the thecæ is inflammable, and employed under the name of lycopode, or vegetable brimstone.
Genus.—Lycopodium.

564. Marsileaceæ, *the Pepperwort Tribe.—Creeping* or *floating* plants. *Leaves* usually stalked, sometimes sessile and scaly. *Reproductive organs* inclosed in involucres, and of two kinds: *the one* stalked, or sessile clustered, membraneous sacs, containing minute granules, sometimes considered as pollen; *the other* membraneous sacs containing simple oval cells, only one of which is developed as a germinating body.

Genus.—Salvima.

Class IV.—Anophytes.

565. Musci, *Mosses.*—Erect or creeping, terrestrial or aquatic plants, found in the most northern latitudes which are known to produce vegetation: they have a distinct axis of growth, and are covered with minute, imbricated, entire, or serrated leaves. Reproductive organs of two kinds: *Antheridia*, consisting of minute cylindrical sacs, containing a multitude of spherical or oval particles. *Pistillidia*, flask-like bodies, each furnished with a membraneous covering (*calyptra*) mixed with empty, jointed filaments or *paraphyses.* The pistillidium when ripe becomes the *capsule*, usually opening by a *lid* (*operculum*), showing the mouth of the capsule naked, or crowned by one or two rows of cellular rigid processes called peristome.

Genera.—Funaria, Polytrichum.

Fig. 217.

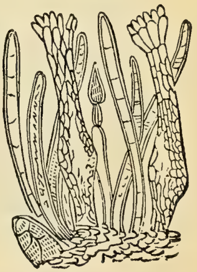
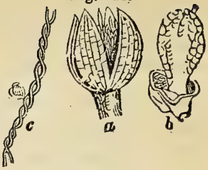


Fig. 217, young spore-cases and paraphyses of Mirium *cuspidatum.*

566. Hepaticæ, *Liverworts.—Cellular plants* growing in earth, or *trees* in damp places; consisting of an axis or stem which is leafless, or the stem and leaves are confluent into an expanded leaf-like moss. Reproductive organs of two kinds:

Fig. 218.



Antheridia and *Pistillidia*, much as in mosses, variously situated. *Thecæ* stalked, opening by irregular fissures or separate teeth. *Spores* globose, usually mixed with spiral elaters. This order has been subdivided into—1. Marchantieæ, thecæ bursting irregularly. 2. Jungermannieæ, thecæ opening by four valves. 3. Riccieæ, thecæ bursting irregularly, without elaters.

GENERA.—Marchantia, Jungermannia.

Fig. 218, *a*, spore-case of JUNGERMANNIA *hyalina*, ripe and bursting; *b*, the same very young, covered with its calyptra; *c*, elater and spore.

CLASS V.—THALLOPHYTES.

567. LICHENES, *Lichens*.—Plants forming a thallus, which is either foliaceous or crustaceous. They are found in all quarters of the globe, growing on the surface of rocks, the bark of trees, or sometimes upon the ground; by their upper surface they draw most of their nourishment from the atmosphere. The fructification is in cups or shields resting on the surface of the thallus and more or less immersed in its substance, or in pulverulent spots scattered over the surface.

a. Properties: used for food and for dyeing.

GENERA.—Gyrophora, Parmelia, Cetraria, Cenomyce, Bæomyces, Usnea.

Fig. 219, *a*, a portion of the thallus of VARIOLARIA *amara*; *b*, a piece of the thallus of STICTA *pulmonacea*; *c*, thallus of the same, bearing shields.

Fig. 219.

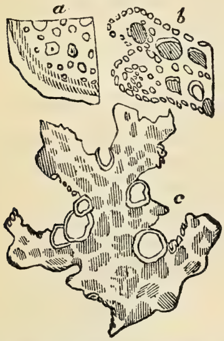


Fig. 220.

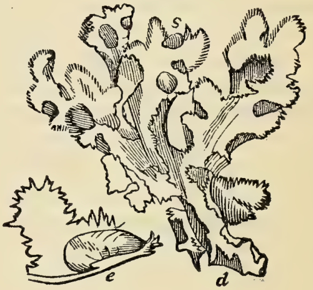


Fig. 220, *d*, CETRARIA *islandica*; *s s*, its shields; *e*, a shield magnified and divided vertically.

568. FUNGI, *Mushrooms*, *Molds*, *&c*.—These are parasitical, or grow upon decayed organic substances, or soil arising from their decomposition. The plants belonging to this order consist of cells, sometimes round, sometimes elongated, in the form

of filamentous threads, appearing like the roots of the fungus that arises from them, and to a certain extent performing the functions of roots. In the Agarics or Mushrooms there appears first a roundish protuberance on the mycelium, which enlarges rapidly, bursts an outer covering (*volva*), and protrudes a thick stalk (*stipe*), bearing on its summit a rounded portion, which soon expands into the *pileus* or *cap*. On its under surface are situated the *lamellæ* or *gills* (*hymenium*), consisting of parallel plates which bear naked *sporules* over their whole surface.

a. Properties: *tonic* when dry, *narcotic* when juicy; some are edible, others poisonous.

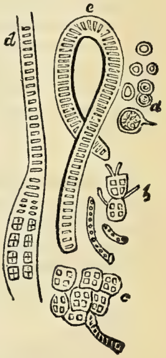
GENERA.—Lycoperdon, Mucor, Uredo, Agaricus, Boletus.

569. CHARACEÆ, *the Chara Tribe.*—Aquatic plants composed of tubular cells, often with a set of smaller tubes inclosing a large central one. Leaves or branches consisting of verticillate tubes. Organs of reproduction of two kinds—a round, red globule, and an axillary nucule which contains the germinating body.

GENUS.—Chara.

570. ALGÆ, *Seaweeds.*—Cellular plants, found both in fresh and salt water. Some have the distinction of stems and fronds; others show simple or branching, solid stems only; and others are mere leafy expansions, of various colors, green, olive, or rose-red. From these we descend to the green Confervæ of pools and ditches, which grow by a subdivision or lateral extension of cells; and lastly, as the lowest form of vegetation, the plant is reduced to a single cell, producing new individuals by the division of the primary cell. Reproductive organs consist of spores contained in *perispores* or *sporecases.* These are sometimes congregated together in receptacles of different kinds. (Plate VIII., Figs. 8, 9, 10, 11.)

Fig. 221.



GENERA.—Fucus, Halymenia, Ulva, Conferva, Nostoc.

Fig. 221, *a*, PROTOCOCCUS *viridis;* *b*, the same beginning to develop; *c*, the same more advanced; *d, e*, SCHIZOGONIUM *murale.*

RULES FOR PRONOUNCING THE NAMES OF PLANTS, ETC.

Botanical names of plants are formed according to the analogies of the ancient languages, chiefly the Latin. Some of the most common terminations of names of Genera and Species, are in *a*, *um*, *us*, and *is*; for example, the generic names Gerardia, Trifolium, Prunus, and Iris; and the specific names, *virginicum*, *candidum*, *blandus*, and *officinalis*. A great proportion of botanical names terminate in *a*, in which case the word has the sound of *a* in *father*, as Rosa, Viola, &c.

The letter *e* at the end of a word is always sounded; for example, *Anemone*, pronounced *anem''o-ne.*

The *e* is long before *s*, when it ends a word, as *Bicor''nes*, pronounced *Bicor-nees.*

In words that end in *ides*, the *i* is short, as in *Hesper''ides.*

The vowels *ae* and *oe* are often used as diphthongs, and then have the sound of *e*, as *Hepaticæ*, pronounced *Hepat'ice*, and *Di-œ-cia*, pronounced *Di-e-cia.*

C and *g*, as in English, are soft before *e*, *i*, and *y*, and hard before *a*, *o*, and *u* The soft sound of *c* is like *s*, the hard sound like *k*. The soft sound of *g* is like *j*, the hard sound like *g*, in the word *gave;* thus *Algæ* is pronounced *Al''je; Musci* is pronounced *Mus''ci.*

The letters *ch* are hard like *k*; as in *Orchis*, pronounced *Or'-kis.*

Accent and Quantity.

The marks over the Generic and Specific names, in the Description of Genera and Species, have reference not only to the *syllable which is to be accented*, but to the *quantity of the vowel* in the accented syllable, as either *long* or *short.*

In those syllables after which the *single mark* is placed, the *vowel* is pronounced *long*, as in *Fra-ga'-ria;* in those syllables after which the *double mark* is placed, the vowel is *short*, as in *He-pat''i-ca;* in the latter case, the stress of voice is thrown upon the consonant; the two marks may, therefore, be considered as indicating that the consonant as well as the vowel is accented.

Words of *two syllables* always have the *accent on the first;* if the syllable *end with a vowel, it is long*, as in *Cro'-cus;* if it *end with a consonant, it is short*, as in *Cac''-tus.*

Figures, and other Characters.

The figures at the right hand of the name of the Genus in the Description of Species, refer to the Class and Order of the Plant in the Artificial System; the word following the figures, and included in a parenthesis, designates the natural order of the plant according to Jussieu.

The following characters denote the duration of the plant:—

☉ Annual— ♂ Biennial— ♃ Perennial— ♄ Woody

Color of Corollas.

r. red, p. purple, g. green, b. blue, w. white, y. yellow. The union of any two or more of these characters denotes that the different colors are united.

Ex stands for exotic.

S. stands for south, referring to a region south of the Middle States.

Time of Flowering.

Mar. March, Ap. April, M. May, J. June, Ju. July, Au. August, S. September, Oc. October, Nov. November.

Localities.

Can. Canada, N. E. New England, Car. Carolina, *Height*, i. and in. inches; f. and ft. feet.

SUPPLEMENT TO LINCOLN'S BOTANY.

BY THE AUTHOR, 1860.

THIS Supplement will furnish the students of LINCOLN'S Botany with a method of analysis by the Natural System, as simple as any which has yet been devised. In preparing this *Artificial Key* to the Natural Orders, the author has availed herself of the Table published by Lindley, in his School Botany, also of De Candolle's *Méthode Analytique*, on which Lindley's Dichotomous Analysis is founded.*

To the beginner, the author would still recommend the method pointed out in Part I. of this book, from page 14 to 26. That "*the difficulties attending analysis by the Natural System alone are too great to be successfully encountered at the threshold of the science,*" it is useless to deny. The attempt to do this has rendered Botany far less popular than formerly; and has, in a degree, excluded it from many schools where it was once a favorite study. But learned professors are beginning to see the error of attempting to exclude the name and labors of the great Linnæus from the science of which he was the father; as well might the name of Euclid be cast out of the science of Geometry, or that of Newton from Astronomy.

The student will need to go on with the study of Vegetable Physiology and Structural Botany, in Part II., in order to understand the principles on which the Natural System is founded, and to become familiar with the language and distinctions of the science. In Part III. will be learned the various methods of classification; and the mind will become gradually familiar with those important characters of plants which, under different views, have served as distinctions to the several divisions. In the review of the Linnæan Classes and Orders which occurs in this part, the prominent Natural Orders are noticed; when these are divided by natural distinctions, the fact is remarked as an evil inseparable from the Linnæan system. But the Natural System, which professed to be able to do so much, has as yet been subject to many and great changes and anomalies. No human science is perfect. The Natural System of Botany, as improved during the last half of the present century, is a great progress. We are to go forward, notwithstanding discouragements.

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* The author being in Switzerland, in 1854, had the privilege of visiting Prof. Adolph De Candolle, at Geneva, and of examining with him his great Herbaria, the largest, probably, in the world; enriched with the treasures which his distinguished father had collected. It was at this time that Prof. De Candolle presented to the author his father's work above referred to.

In Part IV. the student meets with general information upon the Vegetable World and the other Kingdoms of Nature, with a History of Science. Part V. is devoted to the Natural System. It is the object of the following Analytical Table to teach this system, as it is of Part I. to teach the Linnæan System. To those who have faithfully studied the latter, there is provided a rich treat in making the knowledge thus acquired subservient to the comprehension of the great Natural System.

We would suggest to teachers that they should wait before commencing the Natural System, till their pupils have become somewhat familiar with Structural Botany, and the language of the science by frequent reference to the vocabulary as required in the analysis of plants by the Linnæan System. The study of Genera is the great thing, by whatever system they may be found. In this book, the Genera are arranged in alphabetical order, for the study of species. The Generic characters are found described under the Linnæan Class and Order where the particular genus is placed.

With reference to the *Artificial Key* to the Natural System, Lindley remarks: "The principle on which the Key is constructed is always to contrast characters in pairs, and to refer from one contrast to another till at last there is nothing left out of which a further contrast can be drawn up; at that point, where comparison ceases, you ought to find the object of your search. This, which is called *Dichotomous Analysis*, is that, in fact, which the human mind habitually, though unconsciously, employs in all its operations."

First Analysis.—As the Lily is the first flower the structure of which is explained in this book (see page 14), we will commence our analysis by the Natural Method, with this plant. In the Table* we look at the first pair of characters, and we see that the lily is described by

1 *Plants having distinct and visible flowers;* we then go on to
2 *Leaves are not net-veined; it has no woody stem with concentric layers;* but the second set of characters agree with the lily, viz.: leaves *straight-veined,* or *feather-veined,* and not in concentric layers, and we are directed to
205 The Flower has *distinct petals,* which carries us to
213 *Stamens and styles separate.*
214 *Ovary superior.*
219 *Carpels quite united.*
221 Sepals and petals (*perianth*) alike.
221 *Flowers colored.*
223 *Anthers turned inwards* (introrse).
224 *Petals shrivelling irregularly* after flowering. We find our plant to belong to the Order Liliaceæ which is described at section 551, page 291.

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* See page 302 of the Supplement.

Second Analysis.—The POPPY TRIBE.

1 *Flowers visible.*
2 *Leaves net-veined.*
3 *Flowers complete.*
4 *Corolla polypetalous.*
5 *Stamens more than* 20.
6 *Ovary superior;* this takes us to
14 *Leaves without stipules.*
21 *Carpels consolidated in one ovary.*
25 *Fruit one-celled.*
26 *Ovary sessile;* sap milky. We have now arrived at the end of our *botanical* journey; we find our plant belongs to the Natural Order PAPAVERACEÆ, and are directed to section 409, page 250, for farther information.

Third Analysis.—RANUNCULAS or *Crowfoot tribe.* This plant belongs to the great division of POLYPETALOUS EXOGENS, *flowers distinct; leaves net-veined;* flowers more than 20; this brings us to comparison

6 *Ovary superior.*
14 *Leaves without stipules.*
21 *Carpels more or less distinct.*
22 *Stamens hypogynous.*
23 *Calyx a perfect whorl.*
24 *Acrid, nauseous herbs.* RANUNCALACEÆ.

The Crowfoot and Poppy tribes may be thus compared:

RANUNCULACEÆ.	PAPAVERACEÆ.
Stamens numerous.	*Stamens very numerous.*
Carpels distinct.	*Carpels united into one central ovary.*
Juice watery.	*Juice milky.*
Sepals and petals mostly 5: *irregular in numbers, and flowers not always complete.*	*Sepals* 2; *petals* 4.

Fourth Analysis.—The ROSE TRIBE.

1 *Flowers visible.*
2 *Leaves net-veined.*
3 *Flowers complete.*
4 *Corolla polypetalous.*
5 *Stamens more than* 20.
6 *Ovary inferior.*
7 *Leaves with stipules.* This has brought us to the sub-order POMÆ, the Apple tribe, which is one of the divisions of the Rose family—an apple blossom resembles a wild rose.
14 *Leaves with stipules.*
15 *Carpels more or less distinct.*
16 *Stamens perigynous;* this brings us to ROSACEÆ.

Fifth Analysis.—The PEA TRIBE. Beginning at comparison 5 (the others being well understood), we find *stamens less than* 20; this carries us to

31 *Ovary entirely superior.*
44 *Leaves without stipules.*
60 *Carpels consolidated.*
61 *Anthers with longitudinal valves.*
62 *Fruit a legume.* LEGUMENOSÆ.

Sixth Analysis.—The FERN TRIBE.

1 *Plants with visible flowers.*
Plants having no visible flowers. This latter character carries us on to
225 *Stems not jointed.*
226 *Plants with distinct leaves.*
227 *Fructification growing on the back of the leaves.* FILICES, § 562.

TABLE, OR ARTIFICIAL KEY TO THE NATURAL ORDERS.*

1 Plants having distinct and visible flowers... 2
Plants having no visible flowers...............225

2 Leaves net-veined. Wood in concentric layers..................................... 3
Leaves straight-veined, or feather-veined, wood not in concentric layers...205

3 Flowers complete; that is, having both calyx and corolla..... 4
Flowers incomplete; wanting one of the floral envelops......97

4 Corolla polypetalous; that is, the petals distinct..................... 5
Corolla monopetalous; that is, the petals joined into a tube......157

5 Stamens more than 20................. 6
Stamens fewer than 20.................31

6 Ovary inferior; that is, adhering to the calyx more or less... 7
Ovary superior; that is, not adhering at all to the calyx......14

7 Leaves with stipules. *The Apple Tribe,* see POMEÆ in ROSACEÆ......445

8 Carpels more or less distinct from each other.
The Bauera Tr., in *Hydrangeæ,* see SAXIFRAGACEÆ, 460
Carpels wholly combined... 9

9 Placentas spread over the whole surface of the partitions of the fruit.
The Water Lily Tr., NYMPHACACEÆ, 407
Placentas confined to the center or sides of the fruit......10

10 Placentas parietal; that is, adhering to the sides of the fruit 11
Placentas central; that is, growing together in the middle of the fruit...12

11 Petals few in number, and different from the sepals.
The Loasa Tr., LOASACEÆ, 455
Petals numerous, and undistinguishable from sepals.
The Cactus Tr., CACTACEÆ, 453

12 Leaves with little transparent dots. *The Myrtle Tr.,* MYRTACEÆ, 448
Leaves quite opaque.........................13

13 Petals very numerous. *The Fig-Marigold Tr.,* MESEMBRYANTHEMACEÆ, 420
Petals very few (4—5). *The Syringa Tr.,* see *Philadelphiæ* in SAXIFRAGACEÆ, 460

14 Leaves with stipules..........................15
Leaves without stipules.................21

15 Carpels more or less distinct...........16
Carpels wholly consolidated............17

16 Stamens hypogynous. *The Magnolia Tr.,* MAGNOLIACEÆ, 401
Stamens perigynous. *The Rose Tr.,* ROSACEÆ, 445

17 Æstivation of the calyx imbricated..18
Æstivation of the calyx valvate......20

18 Flowers unisexual; that is, stamens in one flower, and pistil in another.
The Euphorbia Tr., EUPHORBIACEÆ, 519
Flowers bisexual; that is, with stamens and pistil in the same flower......19

19 Sepals two. *The Purslane Tr.,* PORTULACACEÆ, 419
Sepals three or five. *The Rock Rose Tr.,* CISTACEÆ, 416

20 Stamens monadelphous; that is, united with each other in a tube.
The Mallow Tr., MALVACEÆ, 421
Stamens all distinct. *The Linden Tr.,* TILIACEÆ, 422

21 Carpels more or less distinct...........22
Carpels quite consolidated..............25

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* The numbers after the name of the Natural Order refer to the sections in this book where that Order is described. The plan is that of Lindley, with some modifications.

22 Stamens perigynous. *The Rose Tr.*, ROSACEÆ, 445
Stamens hypogynous......................23

23 Calyx in a broken whorl. *The Tutsan Tr.*, HYPERICACEÆ, 417
Calyx in a perfect whorl................24

24 Acrid nauseous herbs. *The Crowfoot Tr.*, RANUNCULACEÆ, 400
Aromatic shrubs or trees. *The Anona Tr.*, ANONACEÆ, 402

25 Fruit one-celled............................26
Fruit many-celled...........................27

26 Ovary stalked. Sap watery. *The Caper Tr.*, CAPPARIDACEÆ, 412
Ovary sessile. Sap milky. *The Poppy Tr.*, PAPAVERACEÆ, 409

27 Placentas spread over the dissep. *The Water Lily Tr.*, NYMPHACACEÆ, 407
Placentas in the axis of the fruit.....28

28 Stigma large broad and peltate. *The Sidesaddle Tr.*, SARRACENIACEÆ, 408
Stigma small and simple................29

29 Ovary one-celled. *The Purslane Tr.*, PORTULACACEÆ, 419
Ovary many-celled 30

30 Calyx tubular, furrowed. Stamens perigynous. *The Lythrum Tr.*, SALICACEÆ, 525
Calyx of three or five leaves in a broken whorl. Stamens hypogynous.
The Rock Rose Tr., CISTACEÆ, 416

31 Ovary more or less inferior............32
Ovary entirely superior....................44

32 Leaves with stipules.......................33
Leaves without any stipules............34

33 Flowers unisexual. *The Begonia Tr.* Tropical plants,
belonging to the family, CUCURBITACEÆ, 458
Flowers bisexual. *The Buckthorn Tr.*, RHAMNACEÆ, 441

34 Placentas parietal..........................35
Placentas in the axis........................36

35 Flowers unisexual. *The Gourd Tr.*, CUCURBITACEÆ, 458
Flowers bisexual. *The Currant Tr.*, GROSSULACEÆ, 454

36 Flowers in umbels. *The Umbelliferous Tr.*, UMBELLIFERÆ, 462
Flowers not in umbels 37

37 Carpels solitary. *Combretum Tr.* Tropical plants, allied to the Myrtle family,
Carpels more than one.....................38

38 Carpels divaricating at point. *The Saxifrage Tr.*, SAXIFRAGACEÆ, 460
Carpels quite parallel and united.....39

39 Æstivation of calyx valvate 40
Æstivation of calyx imbricated 42

40 Fruit many-seeded. *The Evening Primrose Tr.*, ONOGRACEÆ, 451
Fruit very few-seeded.....................41

41 Stamens opposite the petals. *The Buckthorn Tr.*, RHAMNACEÆ, 441
Stamens alternate with the petals. *The Dogwood Tr.*, CORNACEÆ, 464

42 Leaves dotted. *The Myrtle Tr.*, MYRTACEÆ, 447
Leaves not dotted 43

43 Stamens doubled down in flower-bud. *The Melastoma Tr.*, MELASTOMACEÆ, 448
Stamens erect. *The Escallonia Tr.*, allied with SAXIFRAGACEÆ, 460

44 Leaves with stipules.......................45
Leaves without stipules...................60

45 Carpels distinct or solitary 46
Carpels consolidated.........................48

46 Anthers with recurved valves. *The Barberry Tr.*, BERBERIDACEÆ, 404
Anthers with longitudinal valves.....47

47 Fruit pod. *The Pea Tr.*, LEGUMINOSÆ, 444
Fruit a capsule, or little drupe. *The Rose Tr.*, ROSACEÆ, 445

48 Placentas parietal........................49
Placentas in the axis......................51

49 Flowers with filamentous crown. *The Passion Fl. Tr.*, PASSIFLORACEÆ, 456
Flowers crownless..........................50

50 Leaves circinate; that is, coiled up, when young.
The Sun-dew Tr., DRASCRACEÆ, 415
Leaves straight when young. *The Violet Tr.*, VIOLACEÆ, 414

51 Styles distinct to the base...............52
Styles more or less combined.........54

52 Flowers unisexual. *The Euphorbia Tr.*, EUPHORBIACEÆ, 519
Flowers bisexual...........................53

53 Petals very minute. *The Knotgrass Tr.*, POLYGONACEÆ, 506
Petals very obvious. *The Saxifrage Tr.*, SAXIFRAGACEÆ, 460

54 Æstivation of calyx imbricated.......55
Æstivation of calyx valvate...........59

55 Leaves regularly opposite..................................56
Leaves alternate, or only occasionally opposite......57

56 Stem articulated; *i. e.*, separating into distinct pieces at the joints.
The Bean-caper Tr., *Zygophyllaceæ*, allied to RUTACEÆ, 433
Stem continuous. *The Bladder Nut Tr.*, STAPHYLACEÆ, 439

57 Calyx in a complete whorl.............58
Calyx in a broken whorl. *The Soap-tree Tr.*, SAPINDACEÆ, 438
Calyx of only two sepals. *The Purslane Tr.*, PORTULACACEÆ, 419

58 Fruit beaked. *The Geranium Tr.*, GERANIACEÆ, 429
Fruit not beaked. *The Wood Sorrel Tr.*, OXALIDACEÆ, 431

59 Stamens perigynous. *The Buckthorn Tr.*, RHAMNACEÆ, 441
Stamens hypogynous. *The Vine Tr.*, VITACEÆ, 442

60 Carpels more or less distinct, or solitary......61
Carpels consolidated....................................68

61 Anthers with recurved valves. *The Berberry Tr.*, BERBERIDACEÆ, 404
Anthers with longitudinal valves.....62

62 Fruit a legume. *The Pea Tr.*, LEGUMINOSÆ, 444
Fruit not a legume.......................63

63 Carpels with hypogynous scales......64
Carpels without hypogynous scales..65

64 One hypog. scale to each carpel. *The Houseleek Tr.*, CRASSULACEÆ, 459
Two hypog. scales to each carpel.
The Francoa Tr., South American plants, allied with *Pyrolœ* in ERICACEÆ, 475

65 Calyx and corolla undistinguishable.
The Carolina Allspice Tr., CALYCANTHACEÆ, 446
Calyx and corolla quite different.....66

66 Herbaceous plants. *The Crowfoot Tr.*, RANUNCULACEÆ, 400
Trees or shrubs................................67

67 Cal. and cor. divided into threes. *The Anona Tr.*, ANNONACEÆ, 402
Cal. and cor. divided into fours. *The Coriaria Tr.*, allied to XANTHOXYLACEÆ, 434

68 Fruit one-celled; if two-celled, then the discepiment a spurious one......69
Fruit with several cells...................73

69 Stamens tetradynamous; that is, four long and two short.
The Cruciferous Tr., CRUCIFERÆ, 411
Stamens not tetradynamous...........70

70	Hypogynous, disk large	71
	Hypogynous, disk absent	72
71	Ovary stalked.	*The Caper Tr.*, CAPPARIDACEÆ, 412
	Ovary sessile.	*The Mignonette Tr.*, RESEDACEÆ, 413
72	Calyx 5-leaved.	*The Turnera Tr.*, tropical plants, allied to LOASACEÆ, 455
	Calyx 3 or 4-leaved.	*The Poppy Tr.*, PAPAVARACEÆ, 409
73	Placentas covering the dissep.	*The Water Lily Tr.*, NYMPHACACEÆ, 407
	Placentas confined to the axis	74
74	Styles distinct to the base	75
	Styles consolidated	80
75	Calyx in a broken whorl	76
	Calyx in a perfect whorl	77
76	Stamens in several parcels.	*The Tutsan Tr.*, allied to HYPERICEÆ, 417
	Stamens in a perfect whorl (monadelphous).	*Flax Tr.*, LINACEÆ, 430
77	Carpels each subtended by an hypogynous scale.	*The Houseleek Tr.*, CRASSULACEÆ, 459
	Carpels scaleless	78
78	Carpels 2, divaricating at end.	*The Saxifrage Tr.*, SAXIFRAGACEÆ, 460
	Carpels more than two, often with a free central placenta	79
79	Calyx tubular.	*The Catchfly or Pink Tr.*, in CARYOPHYLLACEÆ, 418
	Calyx 5, or 4-parted.	*The Chickweed Tr.*, in CARYOPHYLLACEÆ, 418
80	Æstivation of calyx imbricated	81
	Æstivation of calyx valvate or open	96
81	Sepals in a broken whorl	82
	Sepals in a complete whorl	85
82	Fruit splitting into valves.	*The Horsechesnut Tr.*, *Hoppocastanæ* in SAPINDACEÆ, 458
	Fruit not splitting	83
83	Calyx papilionaceous.	*The Milkwort Tr.*, POLYGALACEÆ, 443
	Calyx uniform	84
84	Petals without appendages.	*The Maple Tr.*, ACERACEÆ, 437
	Petals with appendages.	*The Soap Tr.*, SAPINDACEÆ, 438
85	Flowers unisexual	86
	Flowers bisexual	87
86	Leaves dotted.	*The Yellowwood Tr.*, CEDRELACEÆ, 426
	Leaves heath-like and dotless.	*The Crowberry Tr.*, EMPETRACEÆ, 520
87	Leaves dotted	88
	Leaves not dotted	89
88	Fruit a dry capsule.	*The Rue Tr.*, RUTACEÆ,
	Fruit a succulent berry.	*The Orange Tr.*, AURANTACEÆ,
89	Flowers irregular.	*The Balsam Tr.*, BALSAMINACEÆ,
	Flowers regular	90
90	Carpels four or more	91
	Carpels fewer than four	93
91	Ovary 5-parted.	*The Limnanthe Tr.*, in *Tropœolaceæ*, 428
	Ovary undivided	92
92	Stamens distinct.	*The Heath Tr.*, ERICACEÆ, 475
	Stamens monadelphous.	*The Bead-tree Tr.*, or *Melia*, MELIACEÆ, 425
93	Calyx with two sepals.	*The Purslane Tr.*, PORTULACACEÆ, 419
	Calyx with more than two sepals	94
94	Stamens hypogynous	95
	Stamens perigynous.	*The Celastrus Tr.*, CELASTRACEÆ, 410

95 Seeds with a tuft of hairs, or one hair. *Tamarisk Tr.*, *Tamaraceæ*, a doubtful order, MYRICACEÆ, 523
Seeds naked. *The Pittosporam Tr.*, allied to BERBERIDACEÆ, 504

96 Seeds numerous. *The Lythrum Tr.*, LYTHRACEÆ, 449
Seeds very few. *The Buckthorn Tr.*, RHAMNACEÆ, 441

97 Calyx altogether absent.................. 98
Calyx present in some kind of state.105

98 Leaves having stipules................. 99
Leaves destitute of stipules...........102

99 Ovules very numerous. *The Willow Tr.*, SALICACEÆ, 525
Ovules very few..........................100

100 Carpels triple; *i. e.*, 3 consolidated. *Euphorbia Tr.*, EUPHORBIACEÆ, 519
Carpels single............................102

101 Ovule erect; leaves fragrant. *The Gale Tr.*, MYRICACEÆ, 523
Ovule pendulous; leaves scentless. *The Plane Tr.*, ULMACEÆ, 513

102 Flowers unisexual.......................103
Flowers bisexual. *The Pepper Tr.*, PIPERACEÆ, 515

103 Ovules naked; fruit in cones. *The Fir Tr.*, CONIFERÆ, 529
Ovules covered...........................104

104 Carpels single. *The Gale Tr.*, MYRICACEÆ, 523
Carpels double. *The Callitriche Tr.*, CALLITRICHACEÆ, 517

105 Ovary more or less inferior...........106
Ovary superior............................119

106 Leaves with stipules....................107
Leaves without stipules 109

107 Flowers bisexual. *The Birthwort Tr.*, ARISTOLOCHIACEÆ, 501
Flowers unisexual.......................108

108 Fruit in a cup, or cupule. *The Nut or Oak Tr.*, CUPULIFERÆ, 522
Fruit triangular, naked. *The Begonia Tr.*, somewhat allied to ONAGRACEÆ, 451

109 Flowers unisexual.......................110
Flowers bisexual..........................113

110 Flowers in catkins......................111
Flowers not in catkins. *The Gourd Tr.*, CUCURBITACEÆ, 458

111 Leaves simple.............................112
Leaves pinnated. *The Walnut Tr.*, INGLANDACEÆ, 521

112 Leaves opposite. *The Garrya Tr.*, allied to URTICACEÆ, in some of its characters.
Leaves alternate. *The Gale Tr.*, MYRICACEÆ, 523

113 Leaves with transparent dots. *The Myrtle Tr.*, MYRTACEÆ, 447
Leaves dotless 114

114 Ovary many-celled 115
Ovary one-celled..........................116

115 Ovary three or six-celled. *The Birthwort Tr.*, ARISTOLOCHIACEÆ, 501
Ovary four-celled. *The Evening Primrose Tr.*, ONOGRACEÆ, 451

116 Anther many-celled. *The Misseltoe Tr.*, LORANTHACEÆ, 512
Anther two-celled.........................117

117 Stamens numerous, long. *The Combretum Tr.*, allied to MYRTACEÆ, 447
Stamens few and short..................118

118 Embryo straight. *The Evening Primrose Tr.*, ONOGRACEÆ, 451
Embryo curved. *The Goosefoot Tr.*, CHENOPODIACEÆ, 503

119 Leaves with stipules....................120
Leaves without stipules.... 133

120 Flowers unisexual; that is, having stamens in one flower, and pistils in another 121

Flowers bisexual; that is, having stamens and pistils united in the same flower........123

121 Carpels solitary. *The Nettle Tr.*, URTICACEÆ, 528

Carpels more than one........122

122 Flowers in catkins. *The Birch Tr.*, BETULACEÆ, 524

Flowers not in catkins. *The Euphorbia Tr.*, EUPHORBIACEÆ, 519

123 Sepals two. *The Purslane Tr.*, PORTULACACEÆ, 419

Sepals more than two........124

124 Carpels solitary, or quite separate........125

Carpels more than one, consolidated......128

125 Fruit a legume. *The Pea Tr.*, LEGUMINOSÆ, 444

Fruit not a legume........126

126 Calyx membranous. *The Knotgrass Tr.*, POLYGONACEÆ, 506

Calyx firm and herbaceous 127

127 One style to each ovary. *The Rose Tr.*, ROSACEÆ, 445

Three styles to each ovary. *The Buckwheat Tr.*, POLYGONACEÆ, 506

128 Placentas parietal. *The Passion Flower Tr.*, PASSIFLORACEÆ, 456

Placentas in the axis........129

129 Calyx membranous and ragged. *The Elm Tr.*, ULMACEÆ, 513

Calyx firm and equally lobed........130

130 Calyx valvate........131

Calyx imbricated. *The Geranium Tr.*, GERANIACEÆ, 429

131 Stamens monadelphous. *The Sterculia Tr.*, allied to MALVACEÆ, 421

Stamens distinct 132

132 Stamens 4–5, opposite the petals. *The Buckthorn Tr.*, RHAMNACEÆ, 441

Stamens 8–10. *The Linden Tr.*, TILIACEÆ, 422

133 Flowers bisexual; that is, having both stamens and pistils in the same flower........135

Flowers unisexual; that is, having stamens and pistils in separate flowers........155

134 Sepals two. *The Purslane Tr.*, PORTULACACEÆ, 419

Sepals more than two........135

135 Carpels several, consolidated........136

Carpels solitary, or if several quite distinct.....144

136 Placentas parietal. *The Poppy Tr.*, PAPAVERACEÆ, 409

Placentas in the axis........137

137 Number of ovules very small........138

Number of ovules very great........140

138 Leaves dotted. *The Rue Tr.*, RUTACEÆ, 433

Leaves not dotted........139

139 Embryo curved. *The Poke Weed Tr.*, PHYTOLACCACEÆ, 502

Embryo straight. *The Celastrus Tr.*, CELASTRACEÆ, 440

140 Carpels divaricating at point. *The Saxifrage Tr.*, SAXIFRAGACEÆ, 460

Carpels consolidated at the point...141

141 Stamens perigynous 142

Stamens hypogynous........143

142 Fruit one-celled. *The Primrose Tr.*, PRIMULACEÆ, 479

Fruit with several cells. *The Lithrum Tr.*, LYTHRACEÆ, 449

143 Calyx tubular. *The Pink Tr.*, CARYOPHYLLACEÆ, 418

Calyx of distinct sepals. *The Chickweed Tr.*, PRIMULACEÆ, 479

144 Carpels several. *The Crowfoot Tr.*, RANUNCULACEÆ, 400
Carpels solitary..........................145

145 Anther-valves recurved...............146
Anther-valves straight..................147

146 Leafy, erect, shrubs or trees. *The Cinnamon Tr.*, LAURACEÆ, 507
Leafless, twining herbs. *The Cassytha Tr.*, allied to LAURACEÆ, 507

147 Fruit a legume. *The Pea Tr.*, LEGUMINOSÆ, 444
Fruit not a legume.......................148

148 Calyx hardened in the fruit..........149
Calyx always membranous............150

149 Base of calyx hardened. *The Mirabilis Tr.*, NYCTAGINACEÆ, 505
Whole tube of calyx hardened. *The Knawel Tr.*, PORTULACACEÆ, 419

150 Fruit triangular. *The Buckwheat Tr.*, POLYGONIACEÆ, 506
Fruit round....................................151

151 Stamens in the points of the sepals. *The Protea Tr.*, allied to THYMELACEÆ, 508
Stamens not in the points of the sepals......152

152 Leaves covered with scurfiness. *The Oleaster Tr.*, ELEAGNACEÆ, 509
Leaves not scurfy..........................153

153 Cal. tubular. Ovule pendulous. *The Mezereum Tr.*, Daphne in THYMELACEÆ, 508
Calyx open and short. Ovule erect..154

154 Calyx dry and colored. *The Amaranth Tr.*, AMARANTACEÆ, 504
Calyx herbaceous. *The Goosefoot Tr.*, CHENOPODIACEÆ, 503

155 Stamens united in a column. *The Pitcher-plant Tr.*, allied to SARRACENIACEÆ, 408
Stamens distinct.............................156

156 Leaves dotted. *The Yellowwood Tr.*, CEDRELACEÆ, 426
Leaves not dotted. *The Euphorbia Tr.* EUPHORBIACEÆ, 519

157 Ovary superior.............................158
Ovary inferior...............................194

158 Flowers regular.............................159
Flowers irregular...........................185

159 Ovary lobed 160
Ovary not lobed.............................162

160 Leaves dotted. *The Rue Tr.*, RUTACEÆ, 433
Leaves dotless...............................161

161 Flower-branches coiled up before opening. *The Borage Tr.*, BORAGINACEÆ, 490
Flower-branches always straight. *The Nolana Tr.*, allied to the Bindweeds;
separated from the Borage family.

162 Anthers opening by pores............163
Anthers opening by slits...............166

163 Carpels four or five.......................164
Carpels two. *The Nightshade Tr.*, SOLANACEÆ, 496

164 Herbaceous plants. *The Winter-green Tr.*, ERICINÆ, 475
Shrubs..165

165 Anthers two-celled. *The Heath Tr.*, ERICACEÆ, 475
Anthers one-celled. *The Epacris Tr.*, allied to the Heath family,
Australian plants.

166 Carpels four or five.......................167
Carpels three...................................172
Carpels two 174
Carpels one......................................183

167 Stamens opposite petals, and equal to them in number 168
Stamens alternate with petals, or at least twice their number.......169

168 Herbaceous plants. *The Primrose Tr.*, PRIMULACE, 479
Shrubs or trees.
The Ardisia Tr., very rare, tropical plants, allied to PRIMULACEÆ,

169 Brown parasites on roots. *The Monotropa Tr.*, ERICACEÆ, 475
Leafy green plants 170

170 Seeds very numerous. *The Houseleek Tr.*, CRASSULACEÆ, 459
Seeds very few..................................171

171	Ovules erect.	*The Bindweed Tr.*, CONVOLVULACEÆ, 493
	Ovules pendulous.	*The Holly Tr.*, AQUIFOLACEÆ, 476
172	Inflorescence coiled up.	*The Hydrolea Tr.*, HYDROPHYLLACEÆ, 491
	Inflorescence straight..................173	
173	Anthers bursting longitudinally.	*The Greek Valerian Tr.*, POLAMONIACEÆ, 494
	Anthers bursting transversely.	*The Diapensia Tr.*, DIAPENSCACEÆ, 495
174	Stamens two..............................175	
	Stamens four or more..................176	
175	Æstivation of corolla valvate.	*The Olive Tr.*, OLEACEÆ, 500
	Æstivation of corolla imbricated.	*The Jasmine Tr.*, JASMINACEÆ, 499
176	Inflorescence coiled up.	*The Waterleaf Tr.*, HYDROPHYLLACEÆ, 491
	Inflorescence straight..................177	
177	Æstivation of corolla plaited 178	
	Æstivation of corolla imbricated ...180	
178	Seeds very few.	*The Bindweed Tr.*, CONVOLVULACEÆ, 493
	Seeds very numerous....................179	
179	Leaves three-ribbed.	*The Gentian Tr.*, GENTIANACEÆ, 492
	Leaves one-ribbed.	*The Nightshade Tr.*, SOLANACEÆ, 496
180	Anthers adhering to a stigma-like table.	*The Asclepias Tr.*, ASCLEPIADACEÆ, 498
	Anthers quite free.......................181	
181	Parasitical leafless plants.	*The Dodder Tr.*, CONVOLVULACEÆ, 493
	Green leafy terrestrial plants 182	
182	Leaves uniformly three-ribbed.	*The Gentian Tr.*, GENTIANACEÆ, 492
	Leaves one-ribbed.	*The Wormseed Tr.*, COMPOSITÆ, 469
183	Stigma with an external covering.	*The Brunonia Tr.*, native of New Holland, allied to DIPSACEÆ, 468
	Stigma in its ordinary naked state..184	
184	Style one.	*The Plantain Tr.*, PLANTAGINACEÆ, 480
	Styles five.	*The Leadwort Tr.*, PLUMBAGINACEÆ, 481
185	Ovary four-lobed.	*The Mint Tr.*, LABIALÆ, 489
	Ovary undivided...........................186	
186	Carpel solitary.	*The Madwort Tr.*, from *Alyssum* and kindred genera in CRUCIFERÆ, 411
	Carpels two..................................187	
187	Fruit nut-like...............................188	
	Fruit capsular or succulent...........189	
188	Flowers without bracts.	*The Myoporum Tr.*, allied to VERBENACEÆ, 488
	Flowers with bracts.	*The Vervain Tr.*, VERBENACEÆ, 488
189	Seeds winged. Woody climbers.	*The Trumpet-flower Tr.*, BIGNONIACEÆ, 485
	Seeds wingless 190	
190	Brown parasites.	*The Broom Rape Tr.*, OROBANCHACEÆ, 483
	Green leafy plants........................191	
191	Fruit two-celled............................192	
	Fruit with free center placenta.	*The Butterwort Tr.*, GENTIBULARIACEÆ, 482
192	Ovary partly inferior.	*The Gesnera Tr.*, GESNERIACEÆ, 484
	Ovary quite superior.....................193	
193	Seeds without appendages.	*The Figwort Tr.*, SCROPHALARIACEÆ, 487
	Seeds with hooked appendages.	*The Justicia Tr.*, ACANTHACEÆ, 486
194	Carpel solitary..............................195	
	Carpels more than one..................197	
195	Anthers grown together.	*The Composite Tr.*, COMPOSITÆ, 469
	Anthers distinct............................196	
196	Carpel quite solitary.	*The Scabious Tr.*, DIPSACEÆ, 468
	Carpel with two additional abortive ones.	*The Valerian Tr.*, VELERIANACEÆ, 467
'97	Anthers grown together.	*The Lobelia Tr.*, LOBELIACEÆ, 573
	Anthers distinct............................198	

198 Anthers opening by pores. *The Bilberry Tr.* See *Vacceiniæ*, in ERICACEÆ, 475
Anthers opening by slits..............199

199 Stipules between opposite leave. *The Coffee Tr.*, belonging to *Cinchonæ* in RUBIACEÆ, 466
Stipules absent...........................200

200 Stigma with an external covering. *The Goodenia Tr.*, natives of Australia, allied to *Lobelias* and *Campanulas*
Stigma naked...............................201

201 Style and stamens united in an irritable column. *The Stylidium Tr.* Similar in character to the *Goodenia Tr.*; Australian plants.
Style and stamens distinct...........202

202 Seeds very numerous. *The Harebell Tr.*, CAMPANULACEÆ, 474
Seeds very few...............................203

203 Leaves alternate. *The Ebony Tr.*, EBENACEÆ, 477
Leaves opposite..............................204

204 Leaves in pairs. Stem round. *The Honeysuckle Tr.*, CAPRIFOLIACEÆ, 465
Leaves in whorls. Stem square. *The Madder Tr.*, RUBIACEÆ, 466

205 Flowers not having distinct petals..206
Flowers having distinct petals.......213

206 Flowers glumaceous 207
Flowers not glumaceous.............. 208

207 Stems round and hollow. *The Grass Tr.*, GRAMINACEÆ, 559
Stems solid. *The Sedge Tr.*, CYPERACEÆ, 558

208 Flowers on a spadix.....................209
Flowers scattered...........................211

209 Fruit succulent. *The Arum Tr.*, ARACEÆ, 532
Fruit dry...210

210 Anthers sessile. *The Acorus Tr.*, in ARACEÆ, 532
Anthers on long weak stalks. *The Cat-tail Tr.*, TYPHACEÆ, 533

211 Floaters...212
Land plants. *The Arrow-grass Tr.*, JUNCACEÆ, 554

212 Ovules pendulous. *The Naiad Tr.*, NAIADACEÆ, 535
Ovules erect. *The Duckweed Tr.*, LEMNACEÆ, 534

213 Stamens and styles united in a central column. *The Orchis Tr.*, ORCHIDACEÆ, 540
Stamens and styles separate.........214

214 Ovary inferior................................215
Ovary superior................................219

215 Veins of leaves diverging from midrib......216
Veins of leaves parallel with midrib.........217

216 Anther two-celled. *The Ginger Tr.*, GINGIBERACEÆ, 541
Anther one-celled. *The Arrow Root Tr.*, CANNACEÆ, 542

217 Stamens three. *The Iris Tr.*, IRIDACEÆ, 547
Stamens six 218
Stamens more than six. *The Frogbit Tr.*, HYDROCHARIDACEÆ, 538

218 Sepals thin and colored. *The Narcissus Tr.*, AMARYLLIDACEÆ, 544
Sepals herbaceous. *The Pine Apple Tr.*, BROMELIACEÆ, 545

219 Carpels quite separate 220
Carpels quite united.......................221

220 Fruits many-seeded. *The Flowering Rush Tr.*, *Butomaceæ* in ALISMACEÆ, 536
Fruits one-seeded. *The Water-Plantain Tr.*, ALISMACEÆ, 536

221 Sepals herbaceous; petals colored. *The Spiderwort Tr.*, COMMELYNACEÆ, 555
Sepals and petals, or perianth, both alike......222

222 Flowers brown and glumaceous. *The Rush Tr.*, JUNCACEÆ, 554
Flowers colored.............................223

223 Anthers turned outwards. *The Colchicum Tr.*, MELANTHACEÆ, 553
Anthers turned inwards, introse....224

224 Petals rolled inwards after flowering. *The Pontedera Tr.*, PONTEDERIACEÆ, 552
Petals shrivelling irregularly after flowering. *The Lily Tr.*, LILIACEÆ, 551

225 Stems jointed..............................225*
Stems not jointed..........................226

225* Fructification in cones. *The Horsetail Tr.*, EQUISETACEÆ, 561
Fructification axillary and solitary. *The Chara Tr.*, CHARACEÆ, 569

226 Plants with distinct leaves.............227
Plants mere leafless expansions.....230

227 Fructification growing on the back of the leaves. *The Fern Tr.*, FILICES, 562
Fructification distinct from the leaves......228

228 Seed-vessel sessile in the axils of leaves. *The Clubmoss Tr.*, LYCOPODIACEÆ, 563
Seed-vessel on stalks 229

229 Seed-vessel with a lid and calyptra. *The Moss Tr.*, MUSCI, 565
Seed-vessel without lid and calyptra. *The Jugermannia Tr.*, in HEPATICEÆ, 566

230 Seed-vessel opening into valves. *Riccieæ Tr.*, in HEPATICÆ, 566
Seed-vessel without valves............231

231 Seed-vessel stalked and external. *The Marchantia Tr.*, in HEPATICÆ, 566
Seed-vessel stalkless and usually internal......232

232 Growing under water. *The Sea-weed Tr.*, ALGÆ, 570
Growing in the air..........................233

233 Fructification in external shields. *The Lichen Tr.*, LICHENES, 567
Fructification in internal cases. *The Mushroom Tr.*, FUNGI, 568

COMPARATIVE VIEW OF THE TWO GREAT CLASSES IN THE NATURAL SYSTEM.

DICOLYTEDONOUS PLANTS.	MONOCOTYLEDONOUS PLANTS.
Stems generally branched, and when old, covered with cracking bark.	*Stems* generally quite simple; and when old, covered with smooth bark.
Wood, consisting of concentric circles; the central part the oldest and hardest; the bark connected with a central pith, by means of thin plates called medullary rays.	*Wood* not consisting of concentric circles; the central part the youngest and softest; the bark not connected with a central pith by means of medullary rays.
Leaves with veins arranged in a netted manner; usually jointed with the stem.	*Leaves* with simple parallel veins, which are not netted; usually not jointed with the stem.
Flowers usually with the parts arranged in fours or fives.	*Flowers* usually with the parts arranged in threes.
Embryo with two or more seed-lobes or cotyledons.*	*Embryo* with only one seed-tube or cotyledon.
Found wild as trees all over the world, except in the very highest latitudes.	*Found wild* as trees only in hot climates, and chiefly within the tropics.

It will be useful to the student to examine by the Table all such plants as may be met with, whether known or not; though it must be acknowledged that there are serious difficulties in finding the names of strange plants by the Natural System, unless they manifestly belong to some prominent Natural family. That teachers and pupils may not be discouraged in their labors, it is well they should know there are difficulties in the science; that learned Botanists are often obliged to refer to the common name, or tradition, in order to find where others have placed, and how named a particular plant.

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* The Sub-class, *Gymnosperms*, or seeds naked, includes the *cone-bearing plants* with several cotyledons, and therefore not well classed among Dicolytedonous plants, but agreeing with them in many particulars, they are conveniently placed here. The ovules have no pericarp, are sometimes protected by a mere scale. When the seed germinates, the several cotyledons appear as a tuft of seed leaves around the rootlet.

The Author, after seeing for thirty years the success of her works, (from time to time revised and improved,) is happy to be enabled to offer to teachers and private students this SUPPLEMENT, for the more familiar explanation of the Natural System.

To those who have arranged Herbaria according to the system of Linnæus, it is recommended to examine or analyze anew each specimen, writing upon the page to which the plant is affixed the characters of the same, as found by the Natural System—that is, having found the Natural Order to which the plant belongs, copy from that order the characters which are applicable to it.

The Author having found great assistance from this exercise, copies from her own Herbarium the two following examples. The method is merely suggested; it might be carried to a much greater extent. Suppose the plant in question to be the shell-flower:

Example 1st.

PHENOGAMOUS.	DICOLYTEDONOUS.	EXOGENS.
Polypetalous herbs, verdant and leafy. Leaves cauline, or if radical the corolla is spurless.	MOLUCELLA *lævis.* Class DIDYNARNIA, Order GYMNOSPERMIA. Natural Family LABIATÆ.	*Stamens* 2–4, *fewer than the lobes of the corolla. Calyx free from the corolla. Ovary deeply* 4–*lobed, forming* 4 *achenia around the base of the style.*

Example 2d.

PHENOGAMOUS.	DICOLYTEDONOUS.	EXOGENS.	SUB-CLASS.
Polypetalous (see page 247.) Herbs with divided leaves. Flowers mostly perfect. Petals, and mostly the sepals, deciduous. Raceme a long, slender plume.	MACROTYS *racemosa.* Class POLYANDRIA. Order MONOGYNIA. Natural Family RANUNCULACEÆ.		*Angiospermæ.* *Stamens very numerous* (in this plant over 100,) *unconnected with the calyx or corolla, hyperogynous. Calyx free, separate from the pistils. Pistil one. Filaments longer than the anther. Anthers 2-celled.* Synonyms, ACTÆA CIMCIFUGA.

ORIGINAL MEMORANDUM.—"This plant was found by Mr. Wm. E. Aikin, at Gorham, N. Y., in 1828." (Now Prof. Aikin, of the University of Maryland.)

Fig. 171, page 247, was copied from an original drawing of this plant. Most of the numerous figures illustrating the Natural Orders, were taken from drawings from nature, made under the supervision of the Author.

EUTAW-PLACE, BALTIMORE, MARYLAND,
March 1, 1860.

PART VI.

APPENDIX

TO THE

LECTURES ON BOTANY

CONTAINING

I. ILLUSTRATIONS OF THE HABITS OF PLANTS. (*With Eight Engravings.*)

II. GENERA REFERRED TO NATURAL ORDERS

III. DESCRIPTIONS OF GENERA.

IV. DESCRIPTIONS OF SPECIES.

V. INDEX AND VOCABULARY

VI. SYMBOLICAL LANGUAGE OF FLOWERS.

VII. COMMON NAMES OF PLANTS.

SECTION I.

ILLUSTRATIONS OF THE HABITS OF PLANTS

WITH EIGHT ENGRAVINGS.

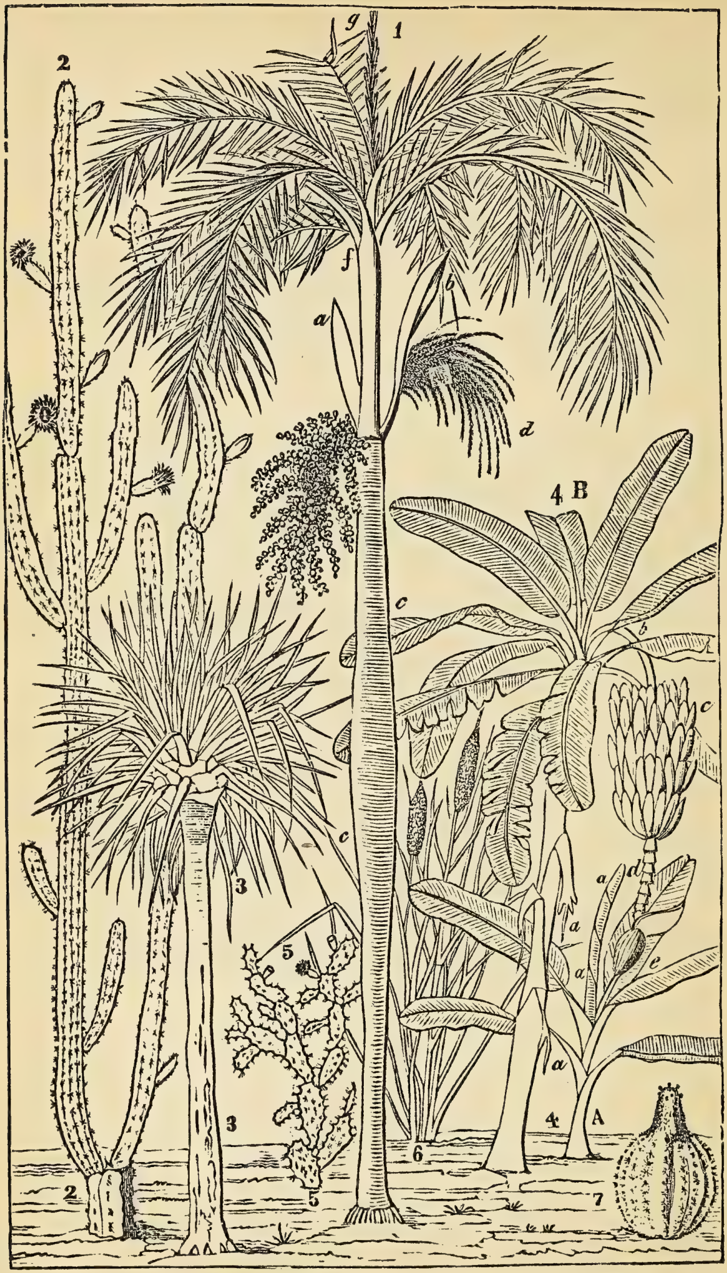
The following Wood Engravings, copied from the elegant work of C. F. Brisseau Mirbel, entitled "*Elemens de Botanique*," are added to this volume, in order to exercise the pupil in the study of the *habits* of plants. The author above alluded to, thus remarks, [we give a translation of his words :]

"In order to learn any part of Natural History, the student must *see much*, and exercise himself that he may *see clearly;* this demands zeal and perseverance. A thousand characters offer themselves to the eye of the naturalist, which are unseen by others; this is, because these characters become striking only by comparison, and the art of comparison supposes knowledge already acquired. In placing before the eye of the pupil figures representing the most striking characters of objects, we take the surest method of helping him forward. We cannot vary too much the forms we offer him.

"The following designs present examples of the plants of all climates, and such as are found in all classes. The minute and extended analyses which will be found in the explanations of some of these plants, are made for the benefit of those pupils who love to push their investigations beyond the mere elements of science; such will soon learn to make observations for themselves, and to test those of others by a comparison with nature.

"The relative size of the different plants represented, is preserved as far as possible, but it was in many cases impossible to give an accurate idea of this, in grouping the figures."

PLATE I.



1 Areca oleracea. 2 Cactus peruvianus. 3 Dracæna draco 4 Musa paradisiaca. 5 Cactus opuntia 6 Typha latifolia. 7 Cactus melocactus

EXPLANATION OF PLATE I.

Fig. 1. Areca *oleracea*. Cabbage-tree. [Family of the *Palms*.] This tree is monœcious. It grows to the height of 120 feet. This is a young plant, little more than 20 feet in height. The stipe is slender, simple, and vertical. Leaves terminal very long, pinnate; petioles sheathing; leafets elongated, lanceolate; spathas monophyllous, growing from the axils of the lower leaves, which fall off; flowers in panicles, the staminate and pistillate flowers enclosed by different spathas. *a*, Spatha shut, *b*, spatha opened laterally; *c*, stipe, which is fusiform;* *d*, panicle of staminate flowers, which were contained in the spatha before it opened; *e*, panicle of pistillate flowers, entirely separated from its spatha; *f*, part of the stipe, formed at its superfices by the base of the developed leaves, and in the interior by the young, tender, and succulent leaves, which form a white compact head. These are eaten by the people of the West Indies as a salad, cooked as we prepare cabbage; the name Areca is given in the East Indies, where this tree flourishes. *g*, is a young leaf folded like a fan. The areca-nut is chewed by the people of India. It is said to resemble the nutmeg. This plant belongs to Monœcia Monodelphia.

Fig. 2. Cactus *peruvianus*. (Family of the *Cacti*.) The name Cacti was given by the Greek botanist, Theophrastus, who first discovered the plant. A succulent plant, becoming woody by age; it rises to the height of thirty feet. It grows among the rocks in Peru, near the sea. The stem is vertical, articulated, branching, spinose, with seven or eight prominent angles. Branches erect; spines acicular, fasciculated. divergent, placed at intervals upon the ridges of the stem and branches. Flowers lateral, cauline, solitary, sub-sessile, it belongs to Icosandria Monogynia.

Fig. 3. Dracæna *draco*. Dragon-tree. (Family *Asphodel*.) A tree of Africa and the Indies, the diameter of whose trunk is very great in comparison to its height. Stipe cylindrical, vertical, marked with transverse cicatrices left by the leaf in falling. Leaves terminal, alternate, crowded, semi-amplexicaulis, ensiform, cuspidate; the upper ones erect, the lower ones pendent, the intermediate ones spreading or reflexed; a red, resinous extract, obtained from this plant, and called Dragon's blood, is sold in the shops. The ancient Greeks introduced it into medicine. This plant is classed in Hexandria Monogynia.

Fig. 4. Musa *paradisiaca*, or the Banana tribe. (Family *Musæ*.) The name Musa is said to have been given by Linnæus in honour of Antonius Musa, the physician of Augustus, who wrote on botany. This is an herbaceous plant, with a perennial bulbous root; it grows to the height of 15 or 20 feet. It is a native of the East Indies, but has been long cultivated in South America. The leaves are radical, petioled, at first convolute; petioles long, large, sheathing, forming by their brim a thick and smooth stem resembling a stipe. The lamina of the leaf is sometimes 9 feet in length and two in breadth, oblong, entire; the sides thick and strong, with the veins at right angles to them, and to the midrib. Scape cylindrical, naked, sheathed. Spike terminal, pendent. Flowers semi-verticillate, bracted; the fertile flowers at the base of the spike, the infertile at the summit. *A*, is a young Banana; *a a*, central leaves, convolute. *B*, a Banana bearing fruit; *a*, remains of old leaves; *b*, the scape; *c*, *d*, *e*, pendent spike; *c*, the fruit, (classed by Mirbel in the genus berry;) *d*, portion of the axis from which the flowers have fallen; *e*, steril flowers, crowded into a compact head, terminal, enveloped by their bracts. This plant is by some placed in the class Hexandria, by others in the now obsolete class Polygamia; but Mirbel, very properly, I think, considers it as belonging to the class Monœcia. The spikes of fruit sometimes weigh from thirty to forty pounds each. The fruit when ripe is yellow. Each berry is about eight inches in length, and one in diameter.

Fig. 5. Cactus *opuntia*. Prickly-pear. (Family of the *Cacti*.) A succulent plant with a woody stem, first described and named by Theophrastus, as a spiny, edible plant. It is a native of southern latitudes, where it grows to the height of eight or ten feet. Stem thick, compressed, ramose, articulated, spinose; the joints are ovate. Leaves very small, cylindrical, subulate, caducous. Spines fasciculated, divergent growing at the base of the leaves.

Fig. 6. Typha *latifolia*. Cat-tail. (Family *Typhæ*.) The name from the Greek *tiphos*, a lake, because it grows in marshy places. An herbaceous plant, monœcious, with a perennial root, growing to the height of eight or ten feet in marshy grounds, in Europe and North America. Stem vertical, simple, aphyllous at its summit, surrounded at the lower part with sheathing petioles. Leaves very long, riband-like. Flowers in a terminal, crowded, cylindrical spike. Barren flowers superior, and separated from the fertile flowers by a short interruption. This plant belongs to Monœcia Triandria.

Fig. 7. Cactus *melocactus*. (Family of the *Cacti*.) Succulent plant from the Antilles, perennial, melon-form, with fifteen or twenty sides, garnished with fascicles of divergent spines.

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* Mirbel, whose description I follow, defines fusiform as tapering at both ends and swelled towards the middle; thus he considers the Radish root as fusiform, while the carrot he calls conical

EXPLANATION OF PLATE II.

Fig. 1 Yucca *aloifolia.* (Family of the *Liliaceæ.*) Adam's Needle. A tree of ten or twelve feet in height, indigenous in the West Indies. Stype cylindric, erect, sometimes two or three-forked. Leaves terminal, alternate, crowded, semi-amplexicaulis, ensiform; the upper ones erect, the lower ones pendent, the intermediate, spreading or reflexed. Panicle simple, terminal, pyramidal. Flowers pendent. Perianth simple, six-sepalled, campanulate. This plant belongs to Hexandria Monogynia. It is the majestic lily of the tropics. The name Yucca is from Jucca, the Indian appellation.

Fig. 2. Saccharum *officinale.* (Family of the *Grasses.*) Sugar-cane. An herbaceous, perennial plant, which grows to the height of ten or twelve feet. Culm is vertical, cylindrical, solid. Leaves sheathing, elongated, ensiform. Panicle large, silky. The name Saccharum is from the Arabic, *soukar*, sugar. This plant is thought to be a native of India, but it is now cultivated in most warm countries. With most of the grass-like plants, it belongs to Triandria Digynia.

Fig. 3. Ferula *tingitana.* (Family of the *Umbelliferæ.*) Giant-fennel. Herbaceous plant, biennial, 8 or 9 feet in height. Stem cylindrical, vertical. Leaves alternate, large, decompound, with very small leafets. Petioles with a large base, amplexicaulis. Panicle terminal, composed of umbels. This plant grows in Spain and Barbary; it belongs to Pentandria Digynia, where the umbelliferous tribe is mostly classed. A species of this genus, Ferula *assafœtida*, produces from its root the medicinal gum, assafœtida; from another species, the galbanum is obtained.

Fig. 4. Cymbidium *echinocarpon.* (Family of the *Orchideæ.*) A parasitic plant of South America, which grows to the height of two or three feet. Stems compressed Leaves opposite, oval, acute. Capsule bristly. This plant belongs to Gynandria Monandria. A species *C.** *pulchellum* (grass-pink) is very common in our region.

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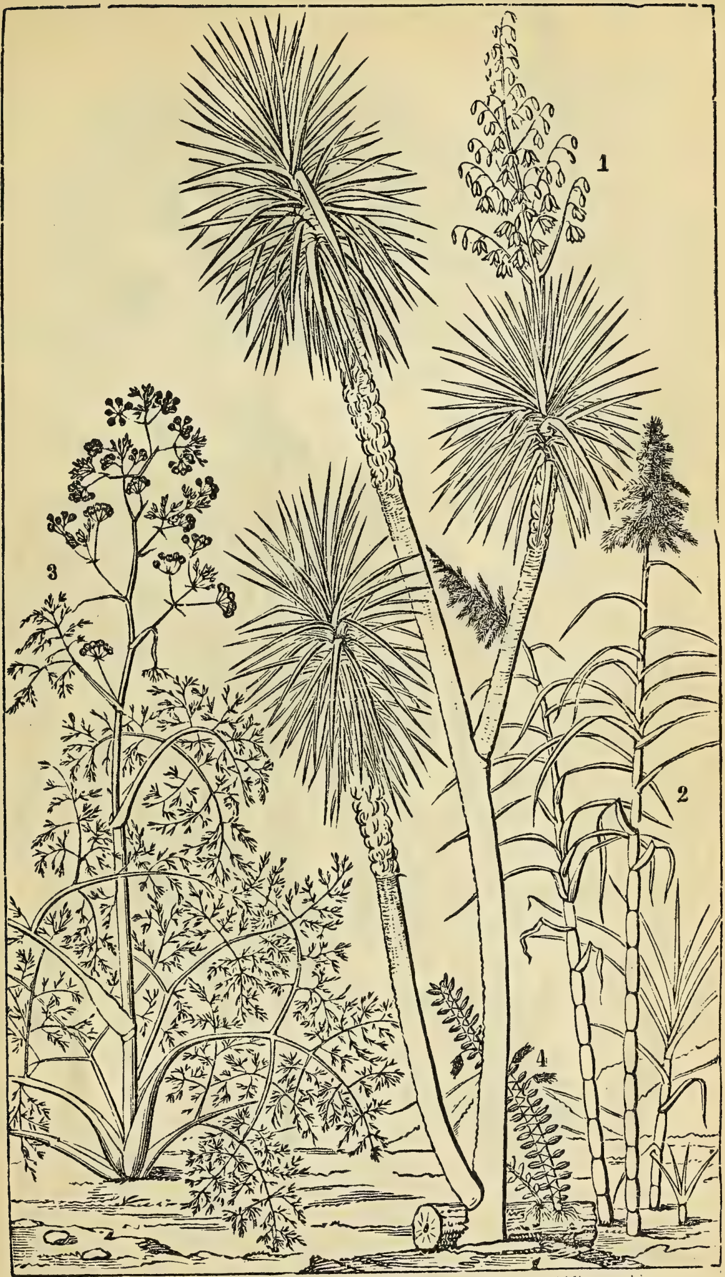
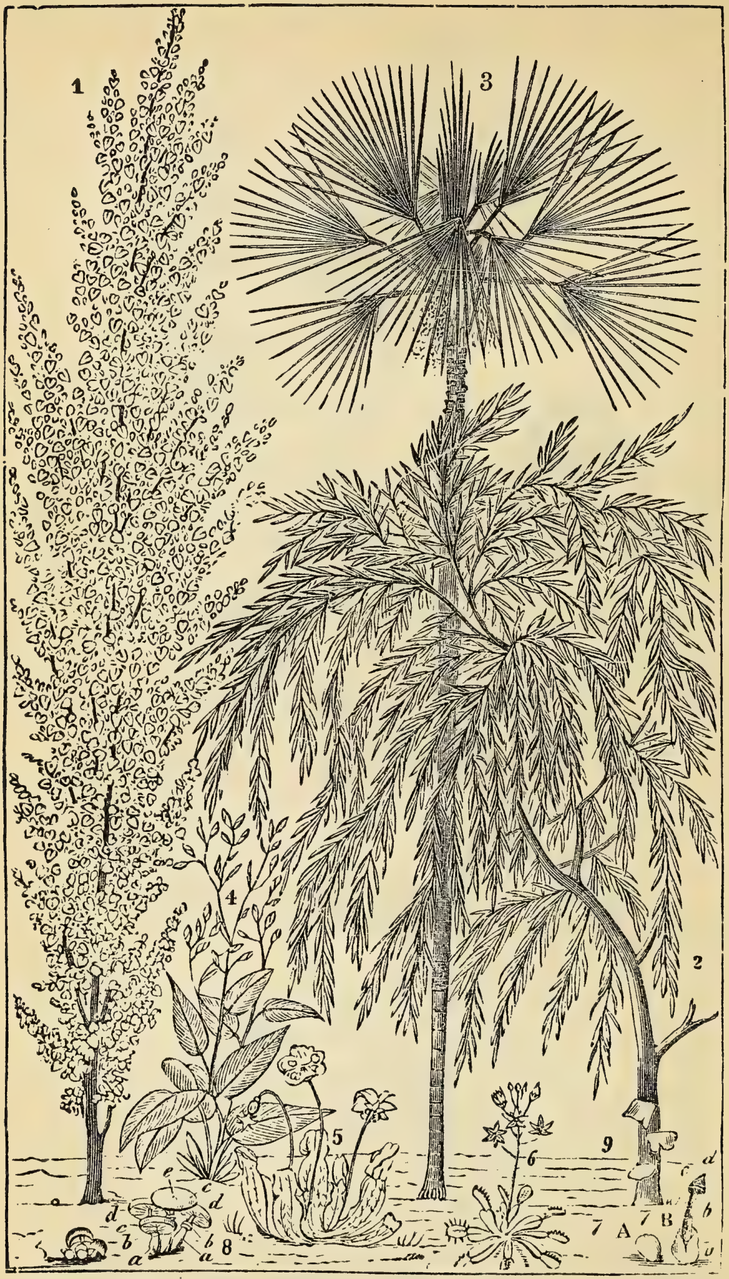
* It may be proper to inform the student, that where several species of a genus are mentioned, it is very common to designate the name of the genus by the initial letter, thus *C.* stands for *Cymbidium*

PLATE II.



1 Yucca aloifolia. 2 Saccharum officinale. 3 Ferula tingitana. 4 Cymbidium echinocarpon

PLATE III.



1 Populus fastigiata. 2 Salix babylonica. 3 Chamærops humilis. 4 Maranta arundinacæ Sarracenia purpurea. 6 Dionæa muscipula. 7 Phallus impudicus. 8 Agaricus cretaceus 9 Boletus

EXPLANATION OF PLATE III.

Fig. 1. Populus *fastigiata.*[*] (Family *Amentaceæ.*) Diœcious tree. It was originally carried from the Levant into France, and is known in the United States as the Lombardy poplar. Trunk vertical. Branches erect, fastigiate. The staminate flowers only are known in this country.

Fig. 2. Salix *babylonica.* Weeping-willow. (Family *Amentaceæ.*) A Diœcious tree, growing to the height of 35 feet; it was originally from the Levant. The fertile plant only exists in this country. Stem branching; the branches are supple, pendent. Leaves alternate, lanceolate.

Fig. 3. Chamaerops *humilis.* (Family of the *Palms.*) Diœcious tree, whose height varies from 4 to 30 feet. It grows in Barbary, Spain, and Italy. Its fruit is called wild dates.

Fig. 4. Maranta *arundinaceæ.* Arrow-root. (Family *Cannæ.*) Perennial plant, four feet high; native of South America. Stem herbaceous, slender, branching. Leaves entire, oval-lanceolate, petioled. Petioles short, sheathing. Flowers terminal. The root of this plant affords a substance resembling starch in many of its properties; this is much valued for its nutritious qualities. The plant belongs to Monandria Monogynia.

Fig. 5. Sarracenia *purpurea.*[†] (Family undetermined.) Side-saddle flower: an herbaceous plant peculiar to marshes of North America. Leaves radical, ascidiate Calyx five-sepalled. Corolla five-petalled.

Fig. 6. Dionaea *muscipula.* Venus' fly-trap. (Family uncertain.)[‡] Perennial, herbaceous. Scape vertical, about eight inches high. Leaves radical, radiating from the centre, petioled. Petiole cruciform. Leaf round, folds itself up suddenly on being touched. Flowers corymbed. Decandria Monogynia.

Fig. 7. Phallus *impudicus.* (Family of the *Fungi.*) Mushroom called morel. *A*, young plant still enclosed in its volva. *B*, a plant perfectly developed; *a*, volva which has burst to make room for the pedicel, *b*; *c*, pileus; *d*, umbo, a central part of the hat, which is pierced in its turn.

Fig. 8. Agaricus *cretaceus.* (Family of the *Fungi.*) Mushroom without a volva *a*, pedicel; *b*, neck; *c*, pileus; *d*, interior surface, forming a layer for the seeds to rest in; *e*, umbo.

Fig. 9. Boletus *salicinus.* Parasite. (Family *Fungi.*) Pileus dimidiate, sessile

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[*] The *dilitata* of most authors.

[†] Lindley establishes a family, *Sarraceniæ,* in which this is the only genus; he considers it to be allied to Papaveraceæ, on account of its dilated stigma, its indefinite number of stamens, and small embryo lying at the base of copious albumen. He also thinks it nearly related to Droseraceæ, or to whatever family the Dionæa may be placed in. The pitcher-form leaf of the Sarracenia is analogous to the dilated foot-stalk of the Dionæa, and the lid of the pitcher in the former leaf is represented by the irritable lamina in the latter. In the structure of its leaves, the Sarracenia is related to the family Nepentheæ containing the pitcher-plant.

[‡] Referred by Lindley to Droseraceæ

EXPLANATION OF PLATE IV.

Fig. 1 Carica *papaya.* Papaw-tree. (Family unknown.)* The name carica is from Caria, where the tree was first cultivated. Diœcious. 20 feet high. It is a native of the East and West Indies and Guinea—Fig. 1. A fertile plant. Trunk very simple, vertical, cylindric, marked with cicatrices produced by the fall of leaves. Leaves terminal, large, seven-lobed, petioled. Petioles two or three feet long. Flowers grow at the base of the petioles. Berries large, furrowed, depressed in the centre. The green fruit is eaten by the Indians in the same manner as we use the turnip. The buds are used for sweetmeats. The ripe fruit is eaten for a dessert, like melons.

Fig. 2. Crescentia *cujete.* Calabash-tree. A tree 16 feet in height; native of South America and the West Indies. Trunk thick. Branches horizontal or reflexed. Leaves fasciculate, obovate, cruciform, fascicles alternate. Flowers rameus, sometimes cauline, solitary. Calyx campanulate, bi-lobed. Corolla large, sub-campanulate. Berries large, resembling the pumpkin in figure; the epicarp cortical, like that of the gourd.

Fig. 3. Vanilla *aromatica.* (Family of the *Orchideæ.*) This plant is sometimes called Epidendron vanilla, the generic name being derived from *epi*, upon, and *dendron*, a tree, because the plant grows parasitically on the trunks and branches of trees. It is perennial, climbing, parasitic; a native of South America. Stems cylindric; flowers ramose, producing roots at every joint, which fasten themselves to the bark of trees. Leaves alternate, oval, oblong, acute, thick. Flowers in terminal spikes, which are lax and pendent. Perianth simple, six-lobed. Capsule fusiform, containing small black seeds which have an aromatic taste and fragrant smell; they are used as perfumes. This plant belongs to Gynandria Monandria.

Fig. 4. Nepenthes *distillatoria.* (Family unknown.)† A perennial plant of the Indies. Stem simple, with leaves towards the base. Leaves alternate, large, oval, lanceolate, contracting at the base into petioles which are semi-amplexicaulis, and terminated at the summit by a tendril which supports an ascidium; this is cylindric, and furnished with an operculum which opens and shuts according to the state of the atmosphere. Flowers terminal, panicled.

Fig. 5. Sempervivum *tectorum.* House-leek tribe.‡ The generic name is derived from the Latin, *semper*, always, *vivire*, to live, and the specific name from *tectum*, house. This is a perennial, herbaceous plant, which grows to the height of sixteen inches. The stem is simple, vertical, foliated. Leaves succulent, oblong, alternate; radical leaves cordate. Flowers in close panicles. Polyandria Polygynia.

Fig. 6. Panicum *italicum.* (Family of the *Grasses.*) An herbaceous, annual plant two feet in height, a native of India. Culm erect. Leaves elongate, lanceolate, sheathing. Spike elongated, compounded of numerous spikelets.

Fig. 7. Clathrus *cancellatus.* Mushroom. (Family of the *Fungi.*) *A*, young plant enclosed in its volva. *B*, another more advanced; *a*, volva ruptured; *b*, peridium beginning to appear. *C*, a plant entirely developed. The peridium is globular and cancellated.

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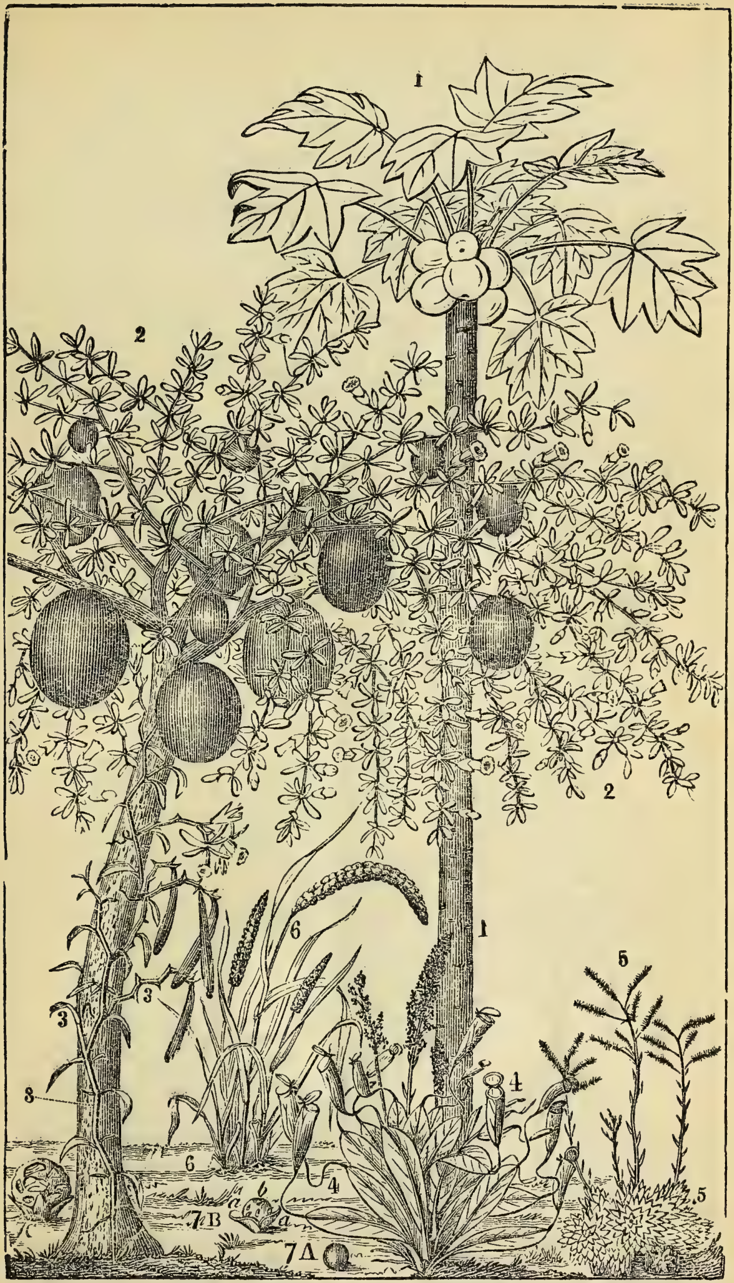
* Lindley forms of this a distinct family, called *Papayaceæ.* He considers it as allied to the Passion flower tribe, in its fruit; and to the Fig tribe, in the separation of stamens and pistils, and in its milky juice, which resembles that found in some species of Ficus.

† Formed by Lindley into a new family, *Nepentheæ.*

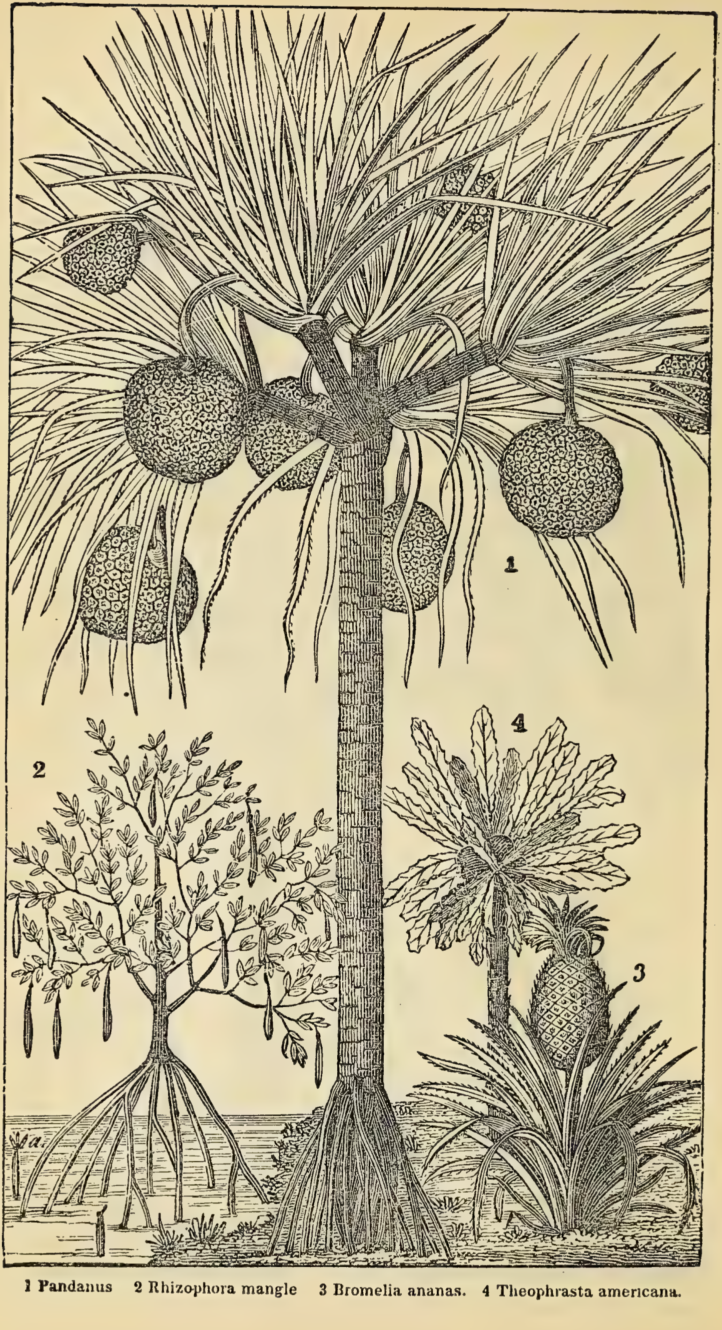
‡ Belonging to the Crassulaceæ of Lindley; allied to the Cacti and Euphorbiæ

PLATE IV.



1 Carica papaya. 2 Crescentia cujete. 3 Vanilla aromatica. 4 Nepenthes distillatoria 5 Sempervivum tectorum. 6 Panicum italicum. 7 Clathrus cancellatus.

PLATE V.



1 Pandanus 2 Rhizophora mangle 3 Bromelia ananas. 4 Theophrasta americana.

EXPLANATION OF PLATE V

Fig. 1. **Pandanus.**[*] Screw-pine. Diœcious tree of South America, 24 feet in height. Fertile plant. Stype cylindric, rectilinear, vertical, branches at the summit. Leaves terminal, crowded, spiral, elongated, amplexicaulis, acuminate, bordered with spinose teeth. Fruit sorose, peduncled, axillary, large, round, woody, composed of a great number of small pericarps of an hexagonal figure. The name Pandanus is from the Malay word *pandang*. The common name is given from the direction of the grain of the bark, which runs spirally.

Fig. 2. Rhizophora *mangle*.[†] A low tree of South America, which grows in salt marshes, and at the mouths of rivers near the sea. It puts forth two kinds of branches, the one bearing leaves, and forming the head of the tree; the other aphyllous, stoloniferous, and inclining downwards, at length taking root and producing new shoots which become perfect plants. Branches opposite. Leaves opposite. Seeds germinating in the fruit still suspended from the branches, and producing clavate radicles twelve or fourteen inches in length; these, detaching themselves from the cotyledon which remains enclosed in the pericarp, fall, and planting themselves in the earth, develop a new trunk and branches. *a*, shows a shoot germinating.

Fig. 3. Bromelia *ananas*.[‡] Pineapple. An herbaceous, perennial plant, four feet high; it is a native of South America and the West Indies. Leaves radical, coriaceous, channelled, ensiform, long, denticulate. Teeth spinose. Scape short. Sorose, ovate, succulent, surmounted with a crown of leaves. This plant belongs to Hexandria Monogynia.

Fig. 4. Theophrasta *americana*. (Family of the *Apocineæ*.)[§] Shrub of South America, four feet high. Trunk very simple, spinose. Leaves crowning, verticillate, elongated, obcrenulate, denticulate. Fruit spherical.

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[*] Belonging to the family Pandaneæ of Brown and De Candolle; somewhat allied to Typhæ in its fructification, and to the Palms in its arborescent stem.

[†] The Mangrove tribe, or Rhizophoreæ of Brown and De Candolle; described as "natives of the shores of the tropics, where they root in the mud, and form a dense thicket to the verge of the ocean."

[‡] Of the family Bromeliaceæ, or Pineapple tribe; Lindley says, "the habit of the Bromeliaceæ is peculiar: they are hard, dry-leaved plants, having a calyx, the rigidity of which is strongly contrasted with the delicate texture of the petals."

[§] Lindley follows Brown in placing this in the order Myrsineæ. He considers it as nearly related to Primulaceæ through some of the genera of that order, and to Sapoteæ through the genus Jacquinia.

EXPLANATION OF PLATE VI.

Fig. 1. Casuarina. (Family *Coniferæ.*)[*] A large tree of New Holland. Trunk thick, head branched; branches flexible, pendent, verticillate, articulated. Monœcia Monandria.

Fig. 2. Agave *americana.*[†] (Family *Narcissi.*) A succulent plant which grows in South America. Leaves radical, crowded, more than four feet long, tapering gradually to a point, channelled, bordered with spinose teeth. Scape more than 20 feet high, cylindric, rectilinear, vertical, with scattering, scale-like, appressed leaves. Panicle simple, pyramidal. Flowers erect, numerous, grouped at the extremity of a long peduncle. This magnificent plant belongs to Hexandria Monogynia.

Fig. 3. Stizolobium *altissimum.* (Family *Leguminosæ.*) A climbing plant which ascends the loftiest trees of the equatorial region. Stem flexible. Leaves alternate, pinnate, trifoliate. Peduncle axillary, filiform, very long, pendent, terminated by an umbel of large and beautiful flowers. Legume acinaciform, wrinkled. Diadelphia Decandria.

Fig. 4. Passiflora *quadrangularis.*[‡] Climbing plant of warm regions of America. Stem quadrangular, slender, cirrose. Leaves alternate, petioled, oblong-oval. Tendrils axillary. Flowers large, axillary. Berries large, ellipsoid.

Fig. 5. Cyperus *papyrus.* Herbaceous plant, perennial, aquatic; fifteen feet high; a native of Egypt. Stem erect, three-sided, aphyllous, sheathing at the base; umbels large, terminal, compound, with an involucrum and an involucel. Triandria Monogynia.

Fig. 6. Iris *germanica.*[§] (Family *Irideæ.*) Herbaceous plant of Europe, three or four feet high, with a perennial root. Leaves radical, equitant, compressed, ensiform. Stem leafy, branching at its summit. Flowers terminal. Perianth simple, six-lobed; three lobes exterior, reflexed; three lobes interior, erect. Triandria Monogynia.

Fig. 7. Hippurus *vulgaris.* Perennial plant growing in wet grounds. Stem cylindrical, very simple. Leaves linear, verticillate. Flowers very small, verticillate. Monandria Monogynia.

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[*] Mirbel establishes a natural order, Casuarineæ, in which he places this genus; Lindley considers it as belonging to Myriceæ. or the Gale tribe; he says, "the nearest approach made by these plants is to the Elm tribe, (Ulmaceæ,) and to the Birch tribe, (Betulineæ,) from the former of which they are readily known by their amentaceous flowers, and want of a perianth; from the latter they are distinguished by their erect ovules, aromatic leaves. and one-celled ovary. Casuarina has the habit of a gigantic Equisetam, (fern,) and can scarcely be compared with any other dicotyledonous tree." Brown considers the genus Casuarina as approximating to Coniferæ, where it was placed by Jussieu, whose arrangement we have followed.

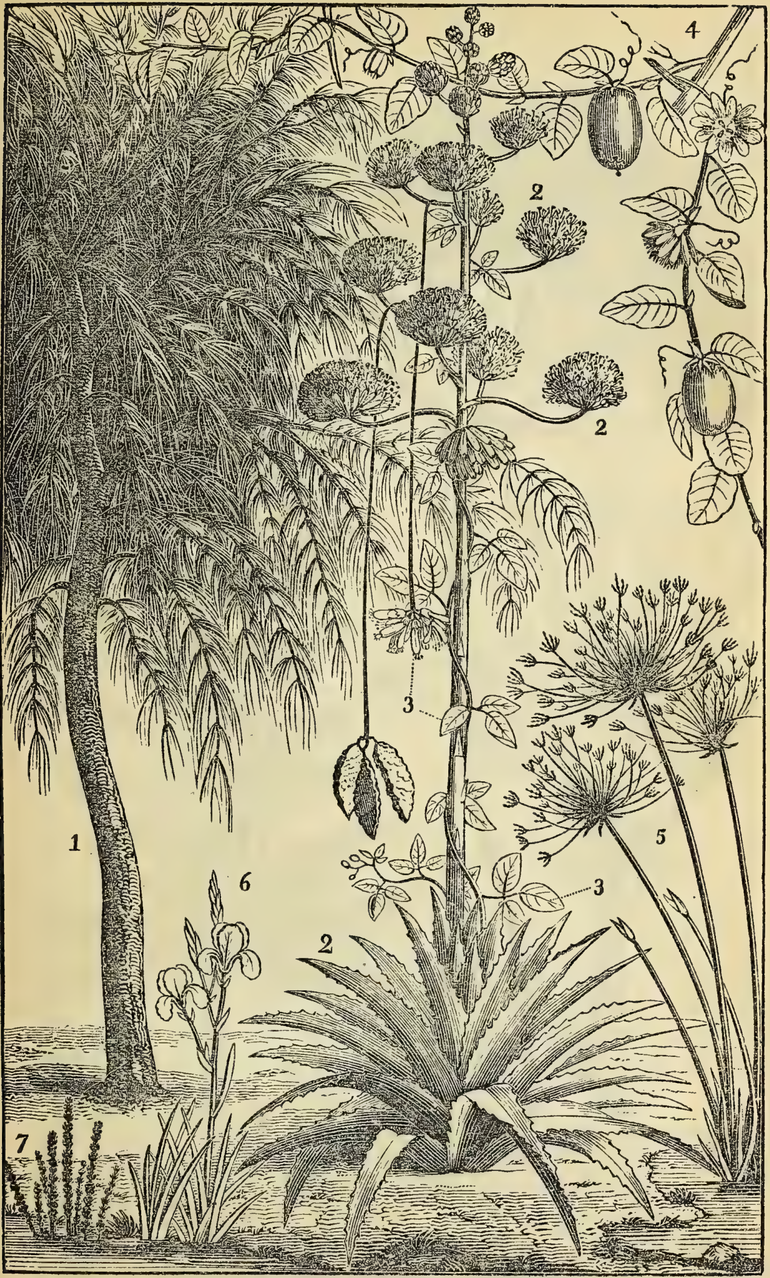
[†] By Lindley, this is placed in his natural order Bromeliaceæ, called Bromeliæ by Jussieu. The habit of Agave is similar to that of Aloe in the order Asphodeleæ.

[‡] Botanists are much divided with respect to that place in the natural method which the Passion-flower tribe should occupy. Jussieu and De Candollo, in view of the organization of the fruit, consider it as nearly allied to Cucurbitaceæ. A separate order, Passifloreæ, is now established among botanists, for this interesting tribe of plants. Jussieu considered that the parts taken for petals, are nothing but inner divisions of the calyx, usually in a coloured state, and wanting in some species. Lindley considers the outer species of the floral envelopes as the calyx, and the inner as the corolla, for two principal reasons; first, they have the ordinary position and appearance of calyx and corolla, the outer being green, the inner coloured; second, there is no essential difference between the calyx and corolla, except one being the outer, the other the inner of the floral envelopes. "The nature of the filamentous appendages, or rays as they are called," says Lindley, "which proceed from the orifice of the tube, and of the processes which lie between the petals and stamens, is ambiguous. I am disposed to refer them to a peculiar form of petals rather than to stamens. There can be no doubt, at least, of their being of an intermediate nature between petals and stamens."

The zealous Catholics who discovered them in the woods of South America, attached to the form of their corolla ideas connected with their religious faith.

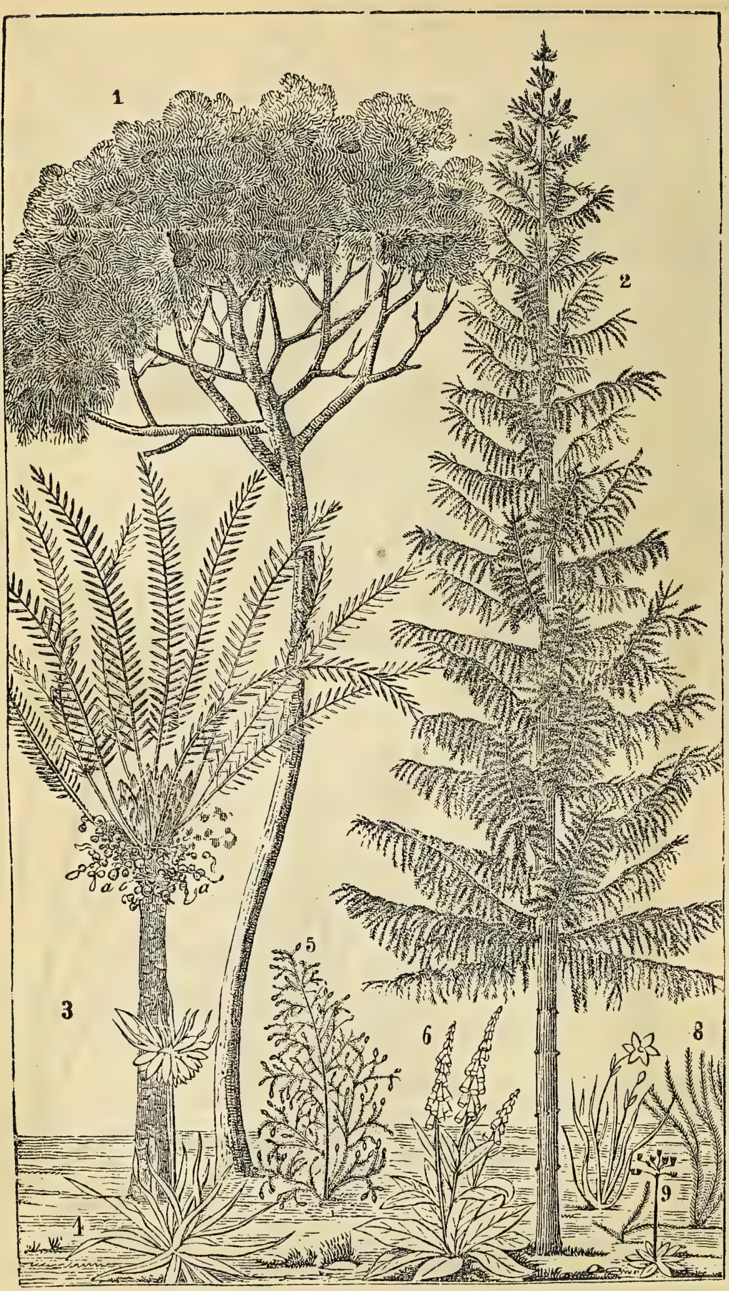
[§] The Irideæ differ from the Narcissi and Amaryllideæ in being triandrous, with the anthers turned outwards; from Orchideæ, to which they are in some respects nearly allied, in not being gynandrous, and in all their anthers being distinct.

PLATE VI.



1 Casuarina. 2 Agave americana. 3 Stizolobium altissimum. 4 Passiflora quadrangularis 5 Cyperus papyrus. 6 Iris germanica. 7 Hippuris vulgaris

PLATE VII.



1 Pinus pinea. 2 Abies picea. 3 Cycas circinalis. 4 Fritillaria imperialis. 5 Lycopodium cernuum 6 Digitalis purpurea. 7 Narcissus poeticus. 8 Lycopodium alopecuroides 9 Dodecatheon meadia.

EXPLANATION OF PLATE VII.

Fig . **Pinus** *pinea.* Stone-pine. The fir tribe. (Family *Coniferæ.*) A native of the south of Europe. The head low and branching. Leaves of a sea-green colour, acicular, forming an egret upon the summits of the branches. Strobilums large, ovate thick; served up in desserts in Italy and France. This tree, according to Loudon, forms a distinguished ornament of the villas of Rome and Florence.

Fig. 2. **Abies** *picea.* Fir-tree. (*Coniferæ.*) Trunk rectilinear, vertical. Branches forming a pyramid; sub-verticillate, very open. Boughs pendent. Leaves small, linear, acute. Strobilums cylindrical, pendent. A tree common to mountainous regions in the north of Europe, and in the United States.

Fig. 3. **Cycas** *circinalis.*[*] A small diœcious tree of India, resembling the palms in its aspect. Stipe vertical, cylindric. Leaves pinnate; leafets lanceolate-linear. Petioles spinose. Spines leafy. Staminate flowers in a catkin. Pistillate flowers in spikes. A fertile plant showing the fructification at *a*. The pith of this plant affords an article called Sago, superior to that brought from the West Indies under that name. This was placed by Linnæus in the family of the Palms, and afterward classed among Ferns. According to Mirbel's drawing and description, the first arrangement was most natural.

Fig. 4. **Fritillaria** *imperialis.* Crown-imperial. (*Liliaceæ.*) Bulbous plant, two or three feet in height; a native of Persia. Leaves radical, elongated, ensiform. Scape naked, vertical. Flowers large, terminal, peduncled, umbelled, pendent. Perianth six-sepalled, campanulate. Bracts numerous, elongated, leafy, erect, crowning.

Fig. 5. **Lycopodium** *cernuum.*[†] Stem erect, branching. Leaves scattered, setaceous, inflated. Spikes small, ovate, drooping. Cryptogamous.

Fig. 6. **Digitalis** *purpurea.*[‡] Fox-glove. (*Scrophulariæ.*) Biennial, native of mountainous and sandy regions of Europe. Stem generally simple, leafy below. Leaves alternate, oval-lanceolate; the radical leaves larger. Flowers in a spike, unilateral, peduncled, pendent. Corolla tubular, campanulate.

Fig. 7. **Narcissus** *poeticus.*[§] (*Narcissi* or *Amaryllideæ.*) Bulbous plant, ten or twelve inches in height. Native in the meadows of Italy and the south of France. Leaves radical, erect, riband-like. Scape naked, uni-flowered. Flower drooping, spathaceous.

Fig. 8. **Lycopodium** *alopecuroides.* Native of South America. Branches fall and take root at their extremities. Leaves linear, subulate.

Fig. 9. **Dodecatheon** *meadia.* (*Primulaceæ.*) Herbaceous plant, eight inches high; originally a native of Virginia. Leaves radical, spreading, oblong. Scape naked, erect. Flowers pedicelled, umbelled, pendent. Corolla five-parted, the divisions reflexed.

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[*] This plant is the principal genus of an order not recognised by Jussieu, the Cycadeæ, first proposed by Ventenat and established by M. Richard. In the cylindrical stem and pinnate leaves, this order resembles the Palms; in many other characteristics, particularly in the organization of the fruit, it approximates to the Coniferæ; in the mode of developing leaves, it bears a relation to the Ferns.

[†] This genus belongs to the natural order Lycopodiaceæ, being, according to Lindley, "intermediate between Ferns and Coniferæ on the one hand, and Ferns and Mosses on the other; related to the first of those tribes in the want of stamens and pistils; to the second, in the aspect of the stems of some of the larger kinds; and to the last, in their whole appearance." M. Brogniart supposes that in the primitive ages of the world, these plants attained a gigantic size, equal to the largest forest trees of the present day; this opinion arises from discoveries made in coal mines, where, along with Ferns, are found what appears like remains of species of this tribe. At present their habit resembles that of the Mosses; they are usually low prostrate plants.

[‡] Lindley says, Digitalis forms a connecting link between Scrophulariæ and Solaneæ in its relation to Verbascum, both genera having alternate leaves.

[§] This order is allied to Asphodeleæ and Liliaceæ, in the appearance of various organs, but distinguished from them by its inferior germ. The corona or nectariferous cup of the Narcissus is considered by Lindley to be nothing more than an organ formed of an extra number of stamens, developed in a petaloid state. The same author remarks, that "there is in this whole order a strong tendency to form another set of staminiferous organs between the perianth, and those stamens that actually develop."

EXPLANATION OF PLATE VIII.

Fig. 1. Vallisneria *spiralis.* A diœcious aquatic plant of Europe, America, and New Holland. Leaves radical, riband-like. A, staminate flower. Peduncles short, terminated by a spike; ovate, spathaceous, remaining under water until the period for fertilizing the pistillate flowers. B, fertile plant, peduncles very long, spiral, uniflowered. Flower spathaceous, floating. This singular plant, in which the two kinds of flowers are entirely separate, is fertilized by a curious provision of nature. When arrived at a mature state, the spiral peduncles of the pistillate flowers untwist themselves, and the flowers rise to the surface of the water; the short spike of staminate flowers breaks off from its peduncle; the flowers light upon the other plant, and shower their pollen over it. After this period, the pistillate flowers disappear below the surface of the water, where their fruit is produced.

Fig. 2. Pistia *stratiotes.* The Duckweed tribe. A floating, stoloniferous plant. Leaves radical, spreading, flabelliform.

Fig. 3. Trapa *natans.*[*] (*Onagræ.*) An aquatic plant. Stem sub-merged, producing radical filaments of two sorts; the one simple, filiform; the other ramified and pinnate; they appear to be transformed leaves. The leaves are terminal, diverging; petioles broad, dentate. A, a plant soon after germination; *a*, the fruit; *b*, petiole from one of the two cotyledons which remain enclosed in the fruit; *c*, the other cotyledon; *d*, root; *e*, stem. B, a plant more developed.

Fig. 4. Butomus *umbellatus.*[†] Flowering-rush tribe. A plant which grows on the border of lakes and rivers. Leaves radical, erect, riband-like, pointed at the summit. Scape rectilinear. Umbel simple, terminal, involucred.

Fig. 5. Potamogeton *compressum.*[‡] An annual, aquatic plant, common in brooks and ditches. Stem compressed, slender, leafy. Leaves alternate, linear. Spikes terminal, interrupted. Flower whorled.

Fig. 6. Nelumbo *nucifera.*[§] An aquatic, perennial plant found in Egypt, India, and America. Leaves radical, peduncled, peltate, round, concave. Peduncle one-flowered. Calyx caducous. Corolla of many spreading petals. Stamens numerous; style, very short; stigma, like a cup; *a*, young leaves; *b*, flower; *c*, fruit.

Fig. 7. Junucs *conglomeratus.*[‖] The Rush tribe. (*Junceæ.*) Stem very simple, aphyllous, rectilinear, vertical, terminating in a point. Panicle crowded, unilateral.

Fig. 8. Fucus *articulatus.*[¶] The Sea-weed tribe. (*Algæ.*) A marine plant of the Atlantic Ocean. Frond cartilaginous, dichotomous, moniliform, articulated, each joint containing fruit.

Fig. 9. Fucus *digitatus.* Stem simple, cylindric. Frond compressed, digitate, flabelliform.

Fig. 10. Fucus *natans.* A marine plant which, detaching itself from the rocks where it originates, floats in vast quantities upon the surface of the sea, forming islands which retard navigation. Stem filiform. Frond branching, lanceolate, dentate.

Fig. 11. Fucus *obtusatus.* A marine plant of Cape Van-Diemen. Frond compressed, coriaceous, branching, linear.

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[*] This plant is in the order Hydrocaryes of De Candolle, called the Water-chestnut Tribe. It is considered by the late modifiers of the natural method, to be nearly allied to Onagræ, distinguished from it only by solitary, pendulous ovules.

[†] This is the leading genus in the order Butomeæ, of Lindley; by De Candolle and Mirbel, placed in Alismaceæ, to which it is closely allied.

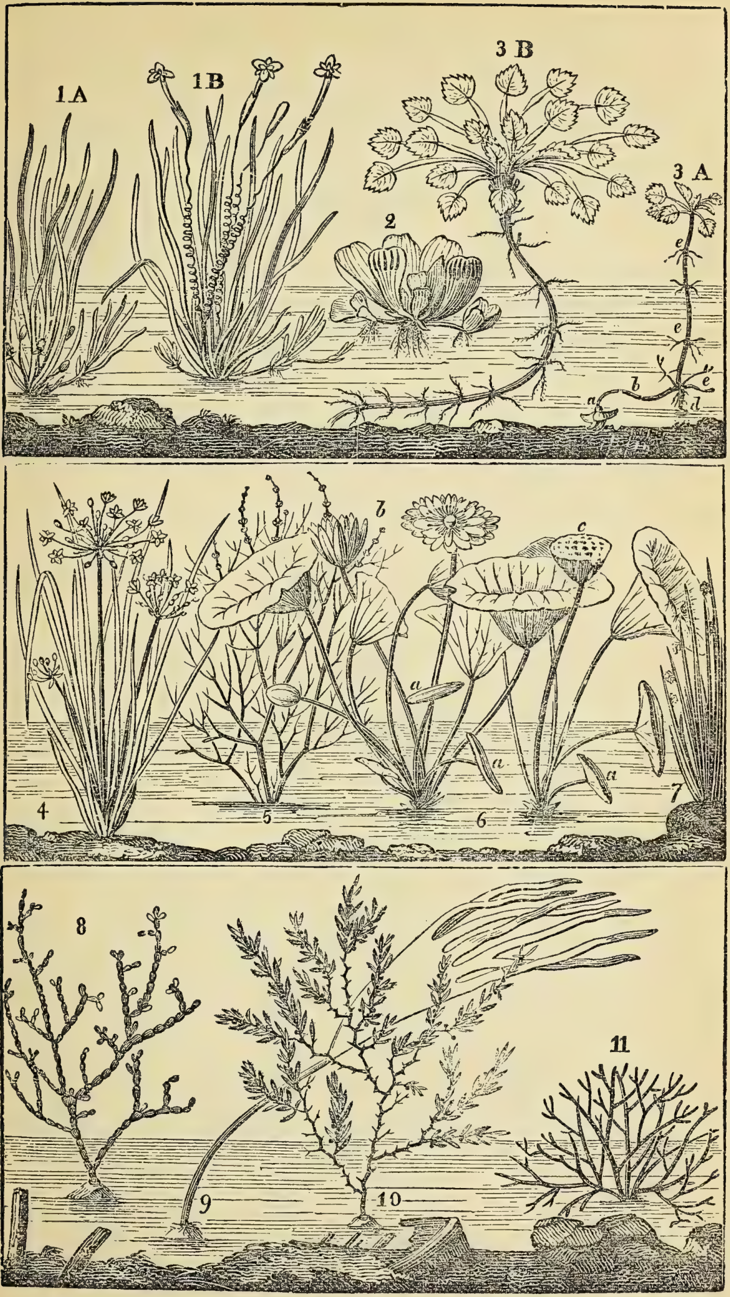
[‡] Of the order Naïdes of Jussieu, or Fluviales of more modern botanists. "In this order," Lindley remarks, "we have the nearest approach, except in Pistiaceæ, to the division of flowerless plants. The perianth is reduced to a few imperfect scales, the habit is almost that of Coniferæ, and there is in some of the genera, either a total absence of spiral vessels, or that form of tissue exists in a very rudimentary state." The affinity of this order to Aroideæ is manifest from the tendency of some species to produce a rudimentary spatha. Mirbel places this in the order Alismaceæ.

[§] In the order Nelumboneæ of De Candolle;—by most writers united to Nymphæaceæ, with which it differs in the structure of the fruit, but agrees in the foliage and flowers. The fruit of one species of Nelumbium is thought to be the Egyptian bean of ancient writers.

[‖] "This plant," according to Lindley, "stands between Petaloideous and Glumaceous Monocotyledons, agreeing with the former in the floral leaves, having assumed the Verticillate state necessary to constitute a perianth, and with the latter in their texture. From Palms, independently of their habit, they are distinguished by the constant tendency to produce more than one ovule in each cell, and by the embryo never being remote from the hilum. Juncus is an instance of a monocotyledonous plant having a distinct pith."

[¶] Lindley describes the order Algæ as "aquatic, leafless, flowerless plants." He says, "Whatever ingenuity may be employed in determining the relative degree of dignity in the vegetable creation between Fungi, Lichens, and Algæ, it seems to me that the conclusion constantly arrived at is, that Algæ are only to be distinguished from the other two by their being in water, and that but for the influence which that medium exercises on them, they would be identical with Lichens on the one hand, and Fungi on the other. Those who have ever examined the surfaces of stones constantly moistened by water, the glass of hot-houses, the face of rocks in the sea, or of walls where the sun never shines, or the hard paths in the damp parts of gardens after rains, cannot fail to have remarked a green, mucous slime, with which they are covered. This slime consists of Algæ in their simplest state of organization, belonging to the genera Palmella, Nostoc, &c. This slime is like a layer of albumen spread with a brush." This albumen, Lindley says, may be the origin of either vegetable or animal matter, according to the nature of the corpuscles which penetrate or develop themselves in it; and, according to some late discoveries, it seems to be ascertained that many of the sea-weed consists of congeries of animalculæ. Thus we see that the vegetable and animal kingdoms not only closely approximate, but that they do, in fact, exist in the most intimate union.

PLATE VIII.



1 Vallisneria spiralis. 2 Pista stratiotes 3 Trapa natans 4 Butomus umbellatus. 5 Potamogeton compressum. 6 Nelumbo nucifera. 7 Juncus conglomeratus. 8 Fucus articulatus 9 Fucus digitatus. 10 Fucus natans. 11 Fucus obtusatus.

GENERA REFERRED TO THE NATURAL ORDERS.

[The figures indicate the paragraphs.]

Abies, Coniferæ, 529.
Abutilon, Malvaceæ, 421.
Acacia, Leguminosæ, 444.
Acalypha, Euphorbiaceæ, 519.
Acer, Aceraceæ, 437.
Acerates, Asclepiadaceæ, 498.
Achillea, Corymbiferæ, 472.
Achyranthes, Amarantaceæ, 504
Acnida, Chenopodiaceæ, 503.
Aconitum, Ranunculaceæ, 400.
Acorus, Araceæ, 532.
Acrostichum, Filices, 562.
Actæa, Ranunculaceæ, 400.
Actinomeris, Corymbiferæ, 472.
Adiantium, Filices, 562.
Adlumia, Fumariaceæ, 410.
Adonis, Ranunculaceæ, 400.
Adoxa, Araliaceæ, 463.
Æschynomene, Legumin. 444.
Æsculus, Hippocastanæ, 438.
Æthusa, Umbelliferæ, 462.
Agaricus, Fungi, 568.
Agave, Amaryllidaceæ, 544.
Ageratum, Corymbiferæ, 472.
Agrimonia, Rosaceæ, 445.
Agrostemma, Caryophyl. 418.
Agrostis, Graminaceæ, 559.
Aira, Graminaceæ, 559.
Ajuga, Labiatæ, 489.
Alchemilla, Rosaceæ, 445.
Aletris, Hæmodoraceæ, 546.
Alisma, Alismaceæ, 536.
Allionia, Nyctaginaceæ, 505.
Allium, Liliaceæ, 551.
Alnus, Betulaceæ, 524.
Alopecurus, Graminaceæ, 559.
Althæa, Malvaceæ, 421.
Alyssum, Cruciferæ, 411.
Amaranthus, Amarantaceæ, 504.
Amaryllis, Amaryllidaceæ, 544.
Ambrosia, Compositæ, 472.
Ammannia, Lythraceæ, 449.
Ammobium, Cichoraceæ, 470.
Amorpha, Leguminosæ, 444.
Ampelopsis, Vitaceæ, 442.
Amphicarpa, Leguminosæ, 444.
Amsonia, Apocynaceæ, 497.
Amygdalus, Rosaceæ, 445.
Amyris, Amyridaceæ, 436.
Anagallis, Primulaceæ, 479.
Anchusa, Boraginaceæ, 490.
Androcera, Solanaceæ, 496.
Andromeda, Ericaceæ, 475.
Andropogon, Graminaceæ, 559.
Androsace, Primulaceæ, 479.
Anemone, Ranunculaceæ, 400.
Anethum, Umbelliferæ, 462.
Angelica, Umbelliferæ, 462.
Annona, Annonaceæ, 402.
Anthemis, Corymbiferæ, 472.
Anthoxanthum, Gramina. 559.
Antirrhinum, Scrophularia. 487.
Anychia, Caryophyllaceæ, 418.
Apargia, Cichoraceæ, 470.
Aphanes, Rosaceæ, 445.
Apios, Leguminosæ, 444.
Apium, Umbelliferæ, 462.
Aplectrum, Orchidaceæ, 540.
Apocynum, Apocynaceæ, 497.
Apogon, Cichoraceæ, 470.
Apteria, Burmanniaceæ, 539.
Aquilegia, Ranunculaceæ, 400.
Arabis, Cruciferæ, 411.
Arachis, Leguminosæ, 444.
Aralia, Araliaceæ, 463.
Arbutus, Ericaceæ, 475.
Archemora, Umbelliferæ, 462.
Arctium, Cinarocephalæ, 471.
Arenaria, Caryophyllaceæ, 418.
Arethusa, Orchidaceæ, 540.
Argemone, Papaveraceæ, 409.
Aristida, Graminaceæ, 559.
Aristolochia, Aristolochia. 501.
Armeniaca, Rosaceæ, 445.
Arnica, Corymbiferæ, 472.
Aronia, Rosaceæ, 445.
Artemisia, Corymbiferæ, 472.
Arum, Araceæ, 532.
Arundo, Graminaceæ, 559.
Asarum, Aristolochiaceæ, 501.
Asclepias, Asclepiadaceæ, 498.
Ascyrum, Hypericaceæ, 417.
Asimina, Annonaceæ, 402.
Asparagus, Liliaceæ, 551.
Asphodelus, Liliaceæ, 551.
Aspidium, Filices, 562.
Asplenium, Filices, 562.
Aster, Corymbiferæ, 472.
Astragalus, Leguminosæ, 444.
Astrophia, Leguminosæ, 444.
Atriplex, Chenopodiaceæ, 503.
Atropa, Solanaceæ, 496.
Avena, Graminaceæ, 559.
Avicennia, Verbenaceæ, 488.
Azalea, Rhododendræ, 475.

Baccharis, Corymbiferæ, 472.
Bæomyces, Lichenes, 567.
Ballota, Labiatæ, 489.
Baptisia, Leguminosæ, 444.
Barbarea, Cruciferæ, 411.
Bartonia, Loasaceæ, 455.
Bartsia, Scrophulariaceæ, 487.
Batschia, Boraginaceæ, 490.
Bejaria, Rhododendræ, 475.
Bellis, Corymbiferæ, 472.
Berberis, Berberidaceæ, 404.
Beta, Chenopodiaceæ, 503.
Betula, Betulaceæ, 524.
Bidens, Corymbiferæ, 472.
Bignonia, Bignoniaceæ, 485.
Blitum, Chenopodiaceæ, 503.
Bœrhaavia, Nyctaginaceæ, 505.
Boletus, Fungi, 568.
Boltonia, Corymbiferæ, 472.
Borago, Boraginaceæ, 490.
Botrychium, Filices, 562.
Brassica, Cruciferæ, 411.
Brickellia, Corymbiferæ, 472.
Briza, Graminaceæ, 559.
Brodiæa, Liliaceæ, 557.
Bromus, Graminaceæ, 559.
Broussonetia, Urticaceæ, 528.
Brunnichia, Polygonaceæ, 506.
Bryophyllum, Crassulaceæ, 459.
Buchnera, Scrophulariaceæ, 487
Bupleurum, Umbelliferæ, 462.
Buxus, Euphorbia. 519.

Cacalia, Corymbiferæ, 472.
Cactus, Cactaceæ, 453.
Calamintha, Labiatæ, 489.
Cakile, Cruciferæ, 411.
Calandrinia, Portulaccaceæ, 419.
Calendula, Corymbiferæ, 472.
Calla, Araceæ, 532.
Callicarpa, Verbenaceæ, 488.
Callitriche, Callitrichaceæ, 517
Calochortus, Liliaceæ, 551.
Caltha, Ranunculaceæ, 400.
Calycanthus, Calycanth. 446.
Calligonum, Polygonaceæ, 506.
Calypso, Orchidaceæ, 540.
Camelina, Cruciferæ, 411.
Camellia, Ternstromiaceæ, 423
Campanula, Campanulaceæ, 474.
Canna, Cannaceæ, 542.
Cannabis, Urticaceæ, 528.
Capraria, Scrophulariaceæ, 487.
Capsicum, Solanaceæ, 496.
Cardamine, Cruciferæ, 411.
Cardiospermum, Sapinda. 438.
Carduus, Cinarocephalæ, 471.
Carex, Cyperaceæ, 558.
Carica, Papayaceæ, 457.
Carpinus, Cupuliferæ, 522.
Carthamus, Cinarocephalæ, 471.
Carum, Umbelliferæ, 462.
Carya, Juglandaceæ, 521.
Cassia, Leguminosæ, 444.
Castanea, Cupuliferæ, 522.
Castilleja, Scrophulariaceæ, 487
Catalpa, Bignoniaceæ, 485.
Caulinia, Naiadaceæ, 535.
Ceanothus, Rhamnaceæ, 441.
Celastrus, Celastraceæ, 440.
Celosia, Amarantaceæ, 504.
Celtis, Ulmaceæ, 513.
Cenomyce, Lichenes, 567.
Centaurea, Cinarocephalæ, 471.
Centaurella, Gentianaceæ, 492.
Cephalanthus, Rubiaceæ, 466.
Ceratiola, Empetraceæ, 520.
Ceranthera, Labiatæ, 489.
Cerastium, Caryophyllaceæ, 418
Cerasus, Rosaceæ, 445.
Ceratophyllum, Ceratophyl. 516
Cercis, Leguminosæ, 444.
Cetraria, Lichenes, 567.
Chæmerops, Palmaceæ, 531.
Chara, Characeæ, 569.
Cheiranthus, Cruciferæ, 411.

Chelidonium, Papaveraceæ, 409.
Chelone, Scrophulariaceæ, 487.
Chenopodium, Chenopodia. 503.
Chimaphila, Ericaceæ, 475.
Chiococca, Rubiaceæ, 466.
Chionanthus, Oleaceæ, 500.
Chondrilla. Cichoraceæ, 470.
Chrysanthemum, Corymbif. 472.
Chryseis, Papaveraceæ. 409.
Chrysobalanus, Rosaceæ, 445.
Chrysocoma, Corymbiferæ, 472.
Chrysogonum, Corymbiferæ, 472
Chrysopsis, Corymbiferæ, 472.
Chrysosplenium, Saxifraga. 460.
Cicer, Leguminosæ, 444.
Cichorium, Cichoraceæ, 470.
Cicuta, Umbelliferæ, 462.
Cimicifuga, Ranunculaceæ, 400.
Cineraria, Corymbiferæ, 472.
Circæa, Onagraceæ, 451.
Cistus, Cistaceæ, 416.
Citrus, Aurantiaceæ, 424.
Clarkia, Onagraceæ, 451.
Claytonia, Portulaccaceæ, 419.
Clematis, Ranunculaceæ, 400.
Cleome, Capparidaceæ, 412.
Clethra, Ericaceæ, 475.
Clinipodium, Labiatæ, 489.
Clintonia, Lobeliaceæ, 473.
Cnicus, Cinarocephalæ, 471.
Cnidum, Umbelliferæ, 462.
Cochlearia, Cruciferæ, 411.
Cocos, Palmaceæ, 531.
Coix, Graminaceæ, 559.
Colchicum. Melanthaceæ, 553.
Collinsia, Scrophulariaceæ, 487.
Collinsonia, Labiatæ, 489.
Colutea, Leguminosæ, 444.
Commelina, Commelynaceæ, 555
Comptonia, Myricaceæ, 523.
Conferva, Algæ, 570.
Conium, Umbelliferæ, 462.
Conradia, Gesneriaceæ, 484.
Convallaria, Liliaceæ, 551.
Convolvulus, Convolvula. 493.
Conyza, Corymbiferæ, 472.
Coptis, Ranunculaceæ. 400.
Corallorhiza, Orchidaceæ, 540.
Corchorus, Tiliaceæ, 422.
Coreopsis, Corymbiferæ, 472.
Coriandrum, Umbelliferæ, 462.
Corispermum, Chenopodia. 503.
Cornus, Cornaceæ, 464.
Coronilla, Leguminosæ, 444.
Coronopus, Cruciferæ, 411.
Corydalis, Fumariaceæ, 410.
Corylus, Cupuliferæ, 522.
Crambe, Cruciferæ, 411.
Cranichis, Orchidaceæ, 540.
Cratægus, Rosaceæ, 445.
Crinum, Amaryllidaceæ, 544.
Crithmum, Umbelliferæ, 462.
Crocus, Iridaceæ, 547.
Crotolaria, Leguminosæ, 444.
Croton, Euphorbiaceæ, 519.
Crypta, Elatinaceæ, 417.
Cryptotœnia, Umbelliferæ, 462.
Cucubalus, Caryophyllaceæ, 418.
Cucumis, Cucurbitaceæ, 458.
Cucurbita, Cucurbitaceæ, 458.
Cunila, Labiatæ, 489.
Cuphea, Lythraceæ, 449.
Cupressus, Coniferæ, 529.
Cuscuta, Convolvulaceæ, 493.
Cycas, Cycadaceæ, 530.
Cymbidium, Orchidaceæ, 540.
Cydona, Rosaceæ, 445.
Cynara, Cinarocephalæ, 471.
[illegible]oglossum, Boraginaceæ, 490.

Cyperus, Cyperaceæ, 558.
Cypripedium, Orchidaceæ, 540.
Cyrilla, Ericaceæ, 475.

Dactylis, Graminaceæ, 559.
Dahlia, Corymbiferæ, 472.
Dalea, Leguminosæ, 444.
Dalibarda, Rosaceæ, 445.
Danthonia, Graminaceæ, 559.
Daphne, Thymelaceæ, 508.
Darlingtonia, Leguminosæ, 444.
Datisca, Urticaceæ, 528.
Datura, Solanaceæ, 496.
Daucus, Umbelliferæ, 462.
Decodon, Lythraceæ, 449.
Decumaria, Saxifragaceæ, 460.
Delphinium, Ranunculaceæ, 400
Dendromecon, Papaveraceæ, 409
Dentaria, Cruciferæ, 411.
Desmodium, Leguminosæ, 444.
Dianthus, Caryophyllaceæ, 418.
Diapensia, Diapensiaceæ, 495.
Dichondra, Convolvulaceæ, 493.
Dielytra, Fumariaceæ, 410.
Diervilla, Caprifoliaceæ, 465.
Digitalis, Scrophulariaceæ, 487.
Dilatris, Hæmodoraceæ, 546.
Diodia, Rubiaceæ, 466.
Dionæa, Droseraceæ, 415.
Dioscorea, Dioscoriaceæ, 548.
Diospyros, Ebenaceæ, 477.
Diphylla, Berberidaceæ, 404.
Dipsacus, Dipsaceæ, 468.
Dirca, Thymelaceæ, 508.
Dodecatheon, Primulaceæ, 479.
Dodonæa, Sapindaceæ, 438.
Dolichos, Leguminosæ, 444.
Draba, Cruciferæ, 411.
Dracocephalum, Labiatæ, 489.
Drosera, Droseraceæ, 415.
Dryas, Rosaceæ, 445.

Echites, Apocynaceæ, 497.
Echinops, Cinarocephalæ, 471.
Echium, Boraginaceæ, 490.
Eclipta, Corymbiferæ. 472.
Eleagnus, Eleagnaceæ, 509.
Elephantopus, Corymbif. 472.
Elliottia, Ericaceæ, 475.
Ellisia, Hydrophyllaceæ, 491.
Elodea, Hypericaceæ, 417.
Elymus, Graminaceæ, 559.
Elytraria, Acanthaceæ, 486.
Empetrum, Empetraceæ. 520.
Enslenia, Asclepiadaceæ, 498.
Epidendrum, Orchidaceæ, 540.
Epigæa, Ericaceæ, 475.
Epilobium, Onagraceæ, 451.
Epiphegus, Orobanchaceæ, 483.
Equisetum, Equisetaceæ, 561.
Erianthus, Graminaceæ, 559.
Erica. Ericaceæ, 475.
Erigonum, Polygonaceæ, 506.
Erigeron, Corymbiferæ, 472.
Eriocaulon, Eriocaulonaceæ,557.
Erodium, Geraniaceæ, 529.
Ervum, Leguminosæ, 444.
Eryngium, Umbelliferæ, 462.
Erysimum, Cruciferæ, 411.
Erythrina, Leguminosæ, 444.
Erythronium, Liliaceæ, 551.
Euchroma, Scrophularia. 487.
Euonymus, Celastraceæ, 440.
Eupatorium, Corymbiferæ, 472.
Euphorbia, Euphorbiaceæ, 519.
Euphrasia, Scrophularia. 487.
Evolvulus, Convolvulaceæ, 493.
Exacum, Gentianaceæ, 492.

Fagus, Cupuliferæ, 522.
Fedia, Valerianaceæ, 467.
Ferula, Umbelliferæ, 462.
Festuca, Graminaceæ, 559.
Ficus, Urticaceæ, 528.
Florkia, Tropæolaceæ, 428.
Fothergilla, Hamamelaceæ, 461
Fragaria, Rosaceæ, 445.
Frankenia, Caryophyllaceæ, 418.
Frasera, Gentianaceæ, 492.
Fraxinus, Oleaceæ, 500.
Fritillaria, Liliaceæ, 551.
Fuschsia, Onograceæ, 451.
Fucus, Algæ, 570.
Fumaria, Fumariaceæ, 410.
Funaria, Musci, 565.

Galactia, Leguminosæ, 444.
Galanthus, Amyrillidaceæ, 544.
Galardia, Corymbiferæ, 472.
Galax, Ericaceæ, 475.
Galega, Leguminosæ, 444.
Galeopsis, Labiatæ, 489.
Galium, Rubiaceæ. 466.
Gaultheria, Ericaceæ, 475.
Gaura, Onagraceæ, 451.
Gelseminum, Bignoniaceæ, 485
Genista, Leguminosæ, 444.
Gentiana, Gentianaceæ, 492.
Geranium, Geraniaceæ, 529.
Gerardia, Scrophulariaceæ, 487.
Geum, Rosaceæ, 445.
Gillenia. Rosaceæ, 445.
Gladiolus, Iridaceæ, 547.
Glaucium, Papaveraceæ, 409.
Glaux, Primulaceæ, 479.
Glechoma, Labiatæ, 489.
Gleditschia, Leguminosæ, 444.
Glycirrhiza, Leguminosæ, 444.
Gnaphalium, Corymbiferæ, 472
Gomphrena, Amarantaceæ, 504.
Gonolobus, Asclepiadaceæ, 498.
Goodyera, Orchidaceæ, 540.
Gordonia, Ternstromiaceæ, 425.
Gossypium, Malvaceæ, 421.
Gratiola, Scrophulariaceæ, 487.
Gymnocladus, Leguminosæ, 444
Gymnostyles, Corymbiferæ, 472.
Gynandropsis, Capparida. 412.
Gyromia, Trilliaceæ, 550.
Gyrophora, Lichenes, 567.

Habenaria, Orchidaceæ, 540
Halesia, Styracaceæ, 478.
Halymenia, Algæ, 570.
Hamamelis, Hamamelacæ, 461
Hamiltonia, Rubiaceæ, 466.
Hedeoma, Labiatæ, 487.
Hedera, Araliaceæ, 463.
Hedyotis, Rubiaceæ, 466.
Hedysarum, Leguminosæ, 444.
Helenium, Corymbiferæ, 472.
Helianthemum, Cistaceæ, 416.
Helianthus, Corymbiferæ, 472.
Heliopsis, Corymbiferæ, 472.
Heliotropium, Boraginaceæ, 490.
Helleborus. Ranunculaceæ, 400.
Helonias, Melanthaceæ, 553.
Hemerocallis, Liliaceæ, 551.
Hemianthus, Scrophularia. 487.
Hepatica, Ranunculaceæ, 400.
Heracleum, Umbelliferæ, 462.
Herpestis, Scrophulariaceæ, 487
Hesperis, Cruciferæ, 411.
Heteranthera. Pontederia. 552.
Heuchera, Saxifragaceæ, 460.
Hibiscus, Malvaceæ, 421.
Hieracium, Cichoraceæ, 470.
Hippophæ, Elægnaceæ, 509.

Hippuris, Halorageæ, 452.
Holcus, Graminaceæ, 559.
Hopea, Malvaceæ, 421.
Hordeum, Graminaceæ, 559.
Hortensia, Saxifragaceæ, 460.
Hottonia, Primulaceæ, 479.
Houstonia, Rubiaceæ, 466.
Hoya, Asclepiadaceæ, 498.
Hudsonia, Cistaceæ, 416.
Humulus, Urticaceæ, 528.
Hyacinthus, Liliaceæ, 551.
Hydrangea, Saxifragaceæ, 460.
Hydrastis, Ranunculaceæ, 400.
Hydrocharis, Hydrocharida. 538.
Hydrochloa, Graminaceæ, 559.
Hydrocotyle, Umbelliferæ, 462.
Hydrolea, Hydrophyllaceæ, 491.
Hydropeltis, Cabombaceæ, 405.
Hydrophyllum,Hydrophylla.491.
Hyoscyamus, Solanaceæ, 496.
Hypericum, Hypericaceæ, 417.
Hypopeltis, Filices, 562.
Hypoxis, Amaryllidaceæ, 544.
Hyptis, Labiatæ, 489.
Hyssopus, Labiatæ, 489.

Ictodes, Araceæ, 532.
Ilex, Aquifoliaceæ, 476.
Illicium, Magnoliaceæ, 401.
Impatiens, Balsaminaceæ, 427.
Indigofera, Leguminosæ, 444.
Inula, Corymbiferæ, 472.
Ionidum, Cistaceæ, 416.
Ipomea, Convolvulaceæ, 493.
Iris, Iridaceæ, 547.
Isanthus, Labiatæ, 487.
Isatis, Cruciferæ, 411.
Isnardia, Onagraceæ, 451.
Isomeris, Capparidaceæ, 412.
Itea, Saxifragaceæ, 460.
Iva, Corymbiferæ, 472.
Ixia, Iridaceæ, 547.

Jasminum, Jasminaceæ, 499.
Jatropha, Euphorbiaceæ, 519.
Jeffersonia, Ranunculaceæ, 400.
Juglans, Juglandaceæ, 521.
Juncus, Juncaceæ, 554.
Jungermannia, Hepaticæ, 566.
Juniperus, Coniferæ, 529.
Justicia, Acanthaceæ, 486.
Jussiæu, Onagraceæ, 451.

Kalmia, Ericaceæ, 475.
Kochia, Chenopodiaceæ, 503.
Kœleria, Graminaceæ, 559.
Krameria, Polygalaceæ, 443.
Krigia, Cichoraceæ, 470.
Kuhnia, Corymbiferæ, 472.
Kyllingia, Cyperaceæ, 558.

Lactuca, Cichoraceæ, 470.
Lamium, Labiatæ, 489.
Lantana, Verbenaceæ, 488.
Lathyrus, Leguminosæ, 444.
Laurus, Lauraceæ, 507.
Lavandula, Labiatæ, 489.
Lavatera, Malvaceæ, 421.
Lechea, Cistaceæ, 416.
Ledum, Ericaceæ, 475.
Leersia, Graminaceæ, 559.
Leiophyllum, Ericaceæ, 475.
Lemna, Lemnaceæ, 534.
Leontice, Berberidaceæ, 404.
Leontodon, Cichoraceæ, 470.
Leonurus, Labiatæ, 489.
Lepidium, Cruciferæ, 411.
Leptandra, Scrophulariaceæ,487.
Leptopoda, Corymbiferæ, 472.
Lepuropetalon, Saxifraga. 460.
Lespedeza, Leguminosæ, 444.
Leucas, Labiatæ, 489.
Lewisia, Portulaccaceæ, 419.
Liatris, Corymbiferæ, 472.
Ligusticum, Umbelliferæ, 462.
Ligustrum, Oleaceæ, 500.
Lilium, Liliaceæ, 551.
Limnanthes, Tropeolaceæ, 428.
Limnetis, Graminaceæ, 559.
Limonia, Aurantiaceæ, 424.
Limosella, Scrophulariaceæ, 487
Linderna, Scrophulariaceæ, 487.
Linnæa, Caprifoliaceæ, 465.
Linum, Linaceæ, 430.
Liparis, Orchidaceæ, 540.
Liquidamber, Balsamifluæ, 526.
Liriodendron, Magnoliaceæ, 401.
Lisianthus, Gentianaceæ, 492.
Listera, Orchidaceæ, 540.
Lithospermum, Boragina. 496.
Lobelia, Lobeliaceæ, 473.
Lolium, Graminaceæ, 559.
Lophiola, Liliaceæ, 551.
Ludwigia, Onagraceæ, 451.
Lunaria, Cruciferæ, 411.
Lupinaster, Leguminosæ, 444.
Lupinus, Leguminosæ, 444.
Luzula, Juncaceæ, 554.
Lychnis, Caryophyllaceæ, 418.
Lycium, Solanaceæ, 496.
Lycoperdon, Fungi, 568.
Lycopodium, Lycopodia. 563.
Lycopsis, Boraginaceæ, 490.
Lygodesmia, Cichoraceæ, 470.
Lygodium, Filices, 562.
Lysimachia, Primulaceæ, 479.
Lythrum, Lythraceæ, 449.

Macbridea, Labiatæ, 487.
Macrotrys, Ranunculaceæ, 400.
Magnolia, Magnoliaceæ, 401.
Malaxis, Orchidaceæ, 540.
Malachodendron, Ternstro. 423.
Malope, Malvaceæ, 421.
Malva, Malvaceæ, 421.
Malvaviscus, Malvaceæ, 421.
Marchantia, Hepaticæ, 566.
Marrubium, Labiatæ, 487.
Marshallia, Corymbiferæ, 472.
Martynia, Bignoniaceæ, 485.
Matricaria, Corymbiferæ, 472.
Meconopsis, Papaveraceæ, 409.
Medeola, Trilliaceæ, 550.
Medicago, Leguminosæ, 444.
Melampyrum, Scrophulari. 487.
Melanthium, Melanthaceæ, 553.
Melananthera, Corymbiferæ, 472.
Melia, Meliaceæ, 425.
Melica, Graminaceæ, 559.
Melilotus, Leguminosæ, 444.
Melissa, Labiatæ, 489.
Melothria, Cucurbitaceæ, 458.
Menispermum, Menispermaceæ,
Mentha, Labiatæ, 489. [403.
Mentzelia, Loasaceæ, 455.
Menyanthes, Gentianaceæ, 492.
Menziesia, Ericaceæ, 475.
Mesembryanthemum, Mes. 420.
Mespilus, Rosaceæ, 445.
Micranthemum, Scrophu. 487.
Micropetalon, Saxifragaceæ, 460.
Microstylis, Orchidaceæ, 540.
Miegia, Graminaceæ, 559.
Mikania, Corymbiferæ, 472.
Millium, Graminaceæ, 559.
Mimulus, Scrophulariaceæ, 485.
Mirabilis, Nyctaginaceæ, 505.
Mitchella, Rubiaceæ, 466.
Mitella, Saxifragaceæ, 460.
Molucella, Labiatæ, 489.
Mollugo, Caryophyllaceæ, 418.
Momordica, Cucurbitaceæ, 458
Monarda, Labiatæ, 489.
Monocera, Graminaceæ, 559.
Monotropa, Ericaceæ, 475.
Monotropsis, Ericaceæ, 475.
Morus, Urticaceæ, 528.
Mucor, Fungi, 568.
Muhlenbergia, Graminaceæ, 559
Mylocarium, Ericaceæ, 475.
Myosotis, Boraginaceæ, 490.
Myosuros, Ranunculaceæ, 400.
Myrica, Myricaceæ, 523.
Myriophyllum, Haloragæ, 452.
Myrtus, Myrtaceæ, 447.

Najas, Naiadaceæ, 535.
Narcissus, Amaryllidaceæ, 544.
Nardus, Graminaceæ, 559.
Narthecium, Juncaceæ, 554
Nasturtium, Cruciferæ, 411.
Nectris, Ranunculaceæ, 400.
Negundo, Aceraceæ, 437.
Nelumbium, Nelumbiaceæ, 406
Nemopanthes, Aquifoliaceæ,476
Nemophila, Hydrophillaceæ,491
Neottia, Orchidaceæ, 540.
Nepeta, Labiatæ, 489.
Nicotiana, Solanaceæ, 496.
Nigella, Ranunculaceæ, 400
Nolina, Liliaceæ, 551.
Nostoc, Algæ, 570.
Nuphar, Nymphæaceæ, 407.
Nuttallia, Rosaceæ, 445.
Nymphæa, Nymphæaceæ, 407
Nyssa, Nyssaceæ, 511.

Obolaria, Orobanchaceæ, 483.
Ocymum, Labiatæ, 489.
Œnanthe, Umbelliferæ, 462.
Œnothera, Onagraceæ, 451
Olea, Oleaceæ, 500.
Onoclea, Filices, 562.
Onopordon, Cinarocephalæ, 471.
Onosmodium, Boraginaceæ, 490
Ophioglossum, Filices, 562.
Ophiorrhiza, Rubiaceæ, 466.
Oplotheca, Geraniaceæ, 429.
Orchis, Orchidaceæ, 540.
Origanum, Labiatæ, 489.
Ornithogalum, Liliaceæ, 551.
Ornus, Oleaceæ, 500.
Orobanche, Orobanchaceæ, 483
Orobus, Leguminosæ, 444.
Orontium, Araceæ, 532.
Orthocarpus, Scrophularia. 487
Oryza, Graminaceæ, 559.
Oryzopsis, Graminaceæ, 559.
Osmorhiza, Umbelliferæ, 462.
Osmunda, Filices, 562.
Ostrya, Cupuliferæ, 522.
Oxalis, Oxalidaceæ, 431.
Oxycoccus, Ericaceæ, 475.
Oxyria, Polygonaceæ, 506.
Oxytropis, Leguminosæ, 444.

Pachysandra, Euphorbia. 519.
Pæonia, Ranunculaceæ, 400.
Panax, Araliaceæ, 463.
Pancratium, Amaryllidaceæ, 544
Panicum, Graminaceæ, 559.
Papaver, Papaveraceæ, 409.
Parietaria, Urticaceæ, 528.
Parmelia, Lichenes. 567.
Parnassia, Hypericaceæ, 417.
Parthenium, Corymbiferæ, 472.
Paspalum, Graminaceæ, 559.

Passiflora, Passifloraceæ, 456.
Pastinaca, Umbelliferæ, 462.
Pectis, Corymbiferæ, 472.
Pedicularis, Scrophularia. 487.
Pelargonium, Geraniaceæ, 429.
Pennisetum, Graminaceæ, 559.
Penthorum, Crassulaceæ, 459.
Pentstemon, Scrophularia. 487.
Periploca, Asclepiadaceæ, 498.
Petalostemon, Leguminosæ, 444.
Peucedanum, Umbelliferæ, 462.
Phaca, Leguminosæ, 444.
Phacelia, Hydrophyllaceæ, 491.
Phalangium, Liliaceæ, 551.
Phalaris, Graminaceæ, 559.
Phaseolus, Leguminosæ, 444.
Philadelphus, Saxifragaceæ, 460.
Philoxerus, Amarantaceæ, 504.
Phleum, Graminaceæ, 559.
Phlox, Polemoniaceæ, 494.
Phœnicaulis, Cruciferæ, 411
Phragmites, Graminaceæ, 559.
Phryma, Verbenaceæ, 488.
Phyllactis, Valerianaceæ, 467.
Phyllanthus, Euphorbia. 519.
Physalis, Solanaceæ, 496.
Phytolacca, Phytolaccaceæ, 502.
Pickeringia, Leguminosæ, 444.
Pinckneya, Rubiaceæ, 466.
Pinguicula, Lentibularia. 482.
Pinus, Coniferæ, 529.
Piper, Piperaceæ, 515.
Piptatherum, Graminaceæ, 559.
Pistia, Lemnaceæ, 534.
Pisum, Leguminosæ, 444.
Pitcheria, Leguminosæ, 444.
Planera, Ulmaceæ, 513.
Plantago, Plantaginaceæ, 480.
Platanthera, Orchidaceæ, 540.
Platanus, Platanaceæ, 527.
Platysternon, Papaveraceæ, 409.
Platyspermum, Cruciferæ, 411.
Plectritis, Valerianaceæ, 467.
Pleea, Melanthaceæ, 553.
Poa, Graminaceæ, 559.
Podophyllum, Ranuncula. 400.
Podostemum, Podostemaceæ, 518
Podostigma, Asclepiadaceæ, 498.
Pogonia, Orchidaceæ, 540.
Polanisia, Capparidaceæ, 412.
Polemonium, Polemoniaceæ, 494.
Polycarpon, Amarantaceæ, 504.
Polycnemum, Amarantaceæ, 504.
Polyanthes, Amaryllidaceæ, 544.
Polygala, Polygalaceæ, 443.
Polygonum, Polygonaceæ, 506.
Polymnia, Corymbiferæ, 472.
Polypodium, Filices, 562.
Polypremum, Scrophularia. 487.
Polypteris, Corymbiferæ, 472.
Polytrichum, Musci, 565.
Pomaria, Leguminosæ, 444.
Pontederia, Pontederiaceæ, 552.
Populus, Salicaceæ, 525.
Porcelia, Annonceæ, 402.
Portulacca, Portulaccaceæ, 419.
Potamageton, Naiadaceæ, 535.
Potentilla, Rosaceæ, 445.
Poterium, Rosaceæ, 445.
Prenanthes, Cichoraceæ, 470.
Primula, Primulaceæ, 479.
Prinos, Aquifoliaceæ, 476.
Proserpinaca, Haloragæ, 452.
Prosopis, Leguminosæ, 444.
Prunella, Labiatæ, 489.
Prunus, Rosaceæ, 445.
Psoralea, Leguminosæ, 445.
Psychotria, Rubiaceæ, 466.
Ptelea, Xanthoxylaceæ, 434
Pteris, Filices, 562.
Pterocaulon, Corymbiferæ, 472.
Pterospora, Ericaceæ, 475.
Pulmonaria, Boraginaceæ, 490.
Punica, Myrtaceæ, 447.
Purshia, Rosaceæ, 445.
Pycnanthemum, Labiatæ, 489.
Pyrola, Ericaceæ, 475.
Pyrus, Rosaceæ, 445.

Quercus, Cupuliferæ, 522.

Ranunculus, Ranunculaceæ, 400.
Raphanus, Cruciferæ, 411.
Rensselaria, Araceæ, 532.
Reseda, Resedaceæ, 413.
Rhamnus, Rhamnaceæ, 441.
Rheum, Polygonaceæ, 506.
Rhexia, Melastomaceæ, 448.
Rhinanthus, Scrophularia. 487.
Rhizophora, Rhizophora. 450.
Rhododendron, Ericaceæ, 475.
Rhodora, Ericaceæ, 475.
Rhus, Anacardiaceæ, 435.
Rhynchospora, Cyperaceæ, 558.
Ribes, Grossulaceæ, 454.
Ricinus, Euphorbiaceæ, 519.
Rivina, Phytolaccaceæ, 502.
Robinia, Leguminosæ, 444.
Rochelia, Boraginaceæ, 490.
Rosa, Rosaceæ, 445.
Rosmarinus, Labiatæ, 489.
Rotbollia, Graminaceæ, 559.
Rubia, Rubiaceæ, 466.
Rudbeckia, Corymbiferæ, 472.
Ruellia, Acanthaceæ, 486.
Rumex, Polygonaceæ, 506.
Ruppia, Naiadaceæ, 535.
Ruta, Rutaceæ, 433.

Sabal, Palmaceæ, 531.
Sabbatia, Gentianaceæ, 492.
Saccharum, Graminaceæ, 559.
Sagina, Caryophyllaceæ, 418.
Sagittaria, Alismaceæ, 536.
Salicornia, Chenopodiaceæ, 503.
Salix, Salicaceæ, 525.
Salsola, Chenopodiaceæ, 503.
Salvia, Labiatæ, 487.
Salvinia, Marsiliaceæ, 564.
Sambucus, Caprifoliaceæ, 465.
Samolus, Primulaceæ, 479.
Sanguinaria, Papaveraceæ, 409.
Sanguisorba, Rosaceæ, 445.
Santolina, Corymbiferæ, 472.
Sapindus, Sapindaceæ, 438.
Saponaria, Caryophyllaceæ, 418.
Sarracenia, Sarraceniaceæ, 408.
Satureja, Labiatæ, 487.
Saururus, Saururaceæ, 514.
Saussurea, Ericaceæ, 475.
Saxifraga, Saxifragaceæ, 460.
Scabiosa, Dipsaceæ, 468.
Scheuchzeria, Juncaginaceæ, 537.
Schizæa, Filices, 562.
Schizandra, Menispermaceæ, 403.
Schœnus, Cyperaceæ, 558.
Schollera, Pontederiaceæ, 552.
Schrankia, Leguminosæ, 444.
Schwalbea, Scrophulari. 487.
Scilla, Lilaceæ, 551.
Scirpus, Cyperaceæ, 558.
Scleranthus, Caryophyllaceæ, 418.
Scleria, Cyperaceæ, 558.
Scolopendrium, Filices, 562.
Scrophularia, Scrophularia. 487.
Scutellaria, Labiatæ, 489.
Secale, Graminaceæ, 559.
Sedum, Crassulaceæ, 459.
Selinum, Cruciferæ, 411.
Sempervivum, Crassulaceæ, 459
Senecio, Corymbiferæ, 472.
Serpicula, Halorageæ, 452.
Sesamum, Bignoniaceæ, 485.
Sesbania, Leguminosæ, 444.
Seseli, Umbelliferæ, 462.
Sesleria, Graminaceæ, 559.
Sesuvium, Mesembryan. 420.
Seymeria, Scrophulariaceæ, 487
Sibbaldia, Rosaceæ, 445.
Sicyos, Cucurbitaceæ, 458.
Sida, Malvaceæ, 421.
Siegesbeckia, Corymbiferæ, 472
Sieversia, Rosaceæ, 445.
Silene, Caryophyllaceæ, 418.
Silphium, Corymbiferæ, 472.
Sinapis, Cruciferæ, 411.
Siphonychia, Amarantaceæ, 504
Sison, Umbelliferæ, 462.
Sisymbrium, Cruciferæ, 411.
Sisyrinchium, Iridaceæ, 547.
Sium, Umbelliferæ, 462.
Smilax, Smilacaceæ, 549.
Solanum, Solanaceæ, 496.
Solea, Violaceæ, 414.
Solidago, Corymbiferæ, 472.
Sonchus, Corymbiferæ, 472.
Sophora, Leguminosæ, 444.
Sorbus, Rosaceæ, 445.
Sorghum, Graminaceæ, 559.
Sparganium, Typhaceæ, 533.
Sparganophorus, Corymbif. 472
Spartium, Leguminosæ, 444.
Spergula, Caryophyllaceæ, 418.
Spermacoce, Rubiaceæ, 466.
Spigelia, Rubiaceæ, 466.
Spinacia, Chenopodiaceæ, 503
Spiræa, Rosaceæ, 445.
Stachys, Labiatæ, 489.
Staphylea, Staphylaceæ, 439.
Statice, Plumbaginaceæ, 481.
Stellaria, Caryophyllaceæ, 418.
Stevia, Corymbiferæ, 472.
Stillingia, Euphorbiaceæ, 519.
Stipa, Graminaceæ, 559.
Stipulicida, Caryophyllaceæ, 418
Stokesia, Corymbiferæ, 472.
Streptanthus, Cruciferæ, 411.
Streptopus, Melanthaceæ, 553.
Strophostyles, Leguminosæ, 444
Stuartia, Ternstromiaceæ, 423.
Stylipus, Rosaceæ, 445.
Stylosanthes, Leguminosæ, 444
Styrax, Styracaceæ, 478.
Subularia, Cruciferæ, 411.
Swertia, Gentianaceæ, 492.
Swietenia, Cedrelaceæ, 426.
Syena, Amaryllidaceæ, 544.
Symphitum, Boraginaceæ, 490.
Symphoria, Caprifoliaceæ, 465.
Synandra, Labiatæ, 489.
Syringa Oleaceæ, 500.

Tagetes, Corymbiferæ, 472.
Talinum, Portulaccaceæ, 419.
Tamarindus, Leguminosæ, 444.
Tanacetum, Corymbiferæ, 472.
Taxus, Coniferæ, 529.
Tephrosia, Leguminosæ, 444.
Teucrium, Labiatæ, 489.
Thalia, Cannaceæ, 542.
Thalictrum, Ranunculaceæ, 400
Thaspium, Umbelliferæ, 462.
Thea, Ternstromiaceæ, 423.
Thermia, Leguminosæ, 444.
Thesium, Cantalaceæ, 510.
Thlaspi, Cruciferæ, 411.
Thuja, Coniferæ, 529

Thymus, Labiatæ, 489.
Thysanocarpus, Cruciferæ, 411.
Tiarella, Saxifragaceæ, 460.
Tigarea, Rosaceæ, 445.
Tigridia, Iridaceæ, 547.
Tilia, Tiliaceæ, 422.
Tillandsia, Bromeliaceæ, 545.
Tipularia, Orchidaceæ, 540.
Tofieldia, Melanthaceæ, 553.
Tradescantia, Commelyna. 555.
Tragopogon, Cichoraceæ, 470.
Trepocarpus, Umbelliferæ, 462.
Tribulus, Zygophyllaceæ, 432.
Trichostema, Labiatæ, 489.
Trientalis, Primulaceæ, 479.
Trifolium, Leguminosæ, 444.
Triglochin, Juncaginaceæ, 537.
Trigonella, Leguminosæ, 444.
Trillium, Trilliaceæ, 550.
Triosteum, Caprifoliaceæ, 465.
Triphora, Orchidaceæ, 540.
Tripsacum, Graminaceæ, 559.
Triticum, Graminaceæ, 559.
Trollius, Ranunculaceæ, 400.
Tropæolum, Tropeolaceæ, 428
Troximon, Cichoraceæ, 470.
Trychophyllum, Corymbif. 472.
Tulipa, Liliaceæ, 551.
Tullia, Labiatæ, 489.
Turritis, Cruciferæ, 411.
Tussilago, Corymbiferæ, 472.
Typha, Typhaceæ, 533.

Udora, Hydrocharidaceæ, 538.
Ulex, Leguminosæ, 444.
Ulmus, Ulmaceæ, 513.
Ulva, Algæ, 570.
Uraspermum, Umbelliferæ, 462.
Uredo, Fungi, 568.
Urtica, Urticaceæ, 528.
Usnea, Lichenes, 567.
Utricularia, Lentibularia. 482.
Uvularia, Melanthaceæ, 553.

Vaccinium, Ericaceæ, 475.
Valeriana, Valerianaceæ, 467.
Valerianella, Valerianaceæ, 467.
Vallisneria, Hydrocharida. 538.
Veratrum, Melanthaceæ, 553.
Verbascum, Scrophularia. 487.
Verbena, Verbenaceæ, 488.
Vernonia, Corymbiferæ, 472.
Veronica, Scrophulariaceæ, 487.
Vesicaria, Cruciferæ, 411.
Vexillaria, Leguminosæ, 444.
Viburnum, Caprifoliaceæ, 465.
Vicia, Leguminosæ, 444.
Villarsia, Gentianaceæ, 492.
Vinca, Apocynaceæ, 497.
Viola, Violaceæ, 414.
Virgilia, Leguminosæ, 444.
Viscum, Loranthaceæ, 512
Vitis, Vitaceæ, 442.

Warea, Cruciferæ, 411.

Xanthium, Corymbiferæ, 472
Xanthoxylum, Xanthoxyla 43
Xanthorhiza, Ranuncula. 400.
Xerophyllum, Melantha. 553.
Xylosteum, Caprifoliaceæ, 465
Xyris, Xyridaceæ, 556.

Yucca, Liliaceæ, 551.

Zamia, Cycadaceæ, 530.
Zannichellia, Naiadaceæ, 535.
Zapania, Verbenaceæ, 488.
Zea, Graminaceæ, 559.
Zigadenus, Melanthaceæ, 553
Zinnia, Corymbiferæ, 472.
Zizania, Graminaceæ, 559.
Zizia, Umbelliferæ, 462.
Ziziphus, Rhamnaceæ, 441
Zornia, Leguminosæ, 444
Zostera, Naiadaceæ, 535.

ADDITIONAL GENERA OF EXOTIC PLANTS REFERRED TO THEIR NATURAL ORDERS.

Acanthophippium, Orchida. 540.
Acanthus, Acanthaceæ, 486.
Acynos, Labiatæ, 489.
Adenocarpus, Leguminosæ, 444.
Adenophora, Campanula. 474.
Agapanthus, Liliaceæ, 551.
Albuca, Liliaceæ, 551.
Allamanda, Apocynaceæ, 419.
Aloe, Liliaceæ, 551.
Alstrœmeria, Amaryllida. 544.
Amelanchier, Rosaceæ, 445.
Amellus, Compositæ, 469.
Amphicoma, Bignoniaceæ, 485.
Androsarmum, Hyperica. 417.
Angelonia, Scrophulariaceæ, 487.
Anigozanthos, Hæmodora. 546.
Anomatheca, Iridaceæ, 547.
Antholyza, Iridaceæ, 547.
Arctotis, Compositæ, 470.
Ardisia, Myrsiniaceæ.
Aristotelia, Tiliaceæ, 422.
Armeria, Plumbaginaceæ, 481.
Asperula, Rubiaceæ, 466.
Atragene, Ranunculaceæ, 400.
Aubrietia, Cruciferæ, 411.

Babiana, Iridaceæ, 547.
Bambusa, Graminaceæ, 559.
Basella, Chenopodiaceæ, 503.
Beaufortia, Myrtaceæ, 447.
Beaumontia, Apocynaceæ, 497.
Buddlea, Scrophulariaceæ, 487
Butomus, Butomaceæ.

Cæsalpina, Leguminosæ, 444.
Calceolaria, Scrophularia. 487.
Callichroa, Compositæ, 469.
Capparis, Capparidaceæ, 412.
Carolinea, Bromeliaceæ.
Cattleya, Orchidaceæ, 540.
Celsia, Solanaceæ, 496.
Cestrum, Solanaceæ, 496.
Chimonanthus, Calycantha. 446.
Chironia, Gentianaceæ, 492.
Clerodendrum, Verbenaceæ, 488.
Clianthus, Leguminosæ, 444.
Clivea, Amaryllidaceæ, 544.
Cobæa, Polemoniaceæ, 494.
Coffea, Rubiaceæ, 466.
Corræa, Rutaceæ, 433.
Coryanthes, Orchidaceæ, 540.
Cosmea, Compositæ, 469.
Cotoneaster, Rosaceæ, 445.
Cotula, Compositæ, 469.
Croton, Euphorbiaceæ, 519.
Cycnoches, Orchidaceæ, 540.
Cyrtochilum, Orchidaceæ, 540.

Dendrobium, Orchidaceæ, 540.
Doronicum, Compositæ, 469.
Doryanthes, Amaryllidaceæ, 544.

Eccremocarpus, Bignonia. 485.
Echinocactus, Cactaceæ, 453.
Enkianthus, Ericaceæ, 475.
Eucalyptus, Myrtaceæ, 447.
Eucharidium, Onagraceæ, 451.
Eutaxia, Leguminosæ, 444.

Gilia, Polemoniaceæ, 494.
Gloriosa, Liliaceæ, 551.
Gloxinia, Gesneriaceæ, 484.
Godetia, Onagraceæ, 451.
Gompholobium, Legumin. 444.
Griffinia, Amaryllidaceæ, 544.

Hæmanthus, Amaryllida. 544.
Helichrysum, Compositæ, 469.
Herbertia, Iridaceæ, 547.

Iodanthus, Cruciferæ, 411.
Iostoma, Lobeliaceæ, 473.
Ixora, Rubiaceæ, 466.

Jacaranda, Bignoniaceæ, 485
Jacksonia, Leguminosæ, 444.

Kaulfussia, Compositæ, 469.
Kennedya, Leguminosæ, 444.
Kolreuteria, Sapindaceæ, 438.

Lachenalia, Liliaceæ, 551.
Lælia, Orchidaceæ, 540.
Lagenaria, Cucurbitaceæ, 458.
Lagerstroemia, Lythraceæ, 449
Lagetta, Thymelaceæ, 508.
Lasthenia, Compositæ, 469.
Leonotis, Labiatæ, 487.
Leptosiphon, Polemonia. 494.
Leptospermum, Myrtaceæ, 447
Leucojum, Amaryllidaceæ, 544
Lotus, Leguminosæ, 444.
Lucula, Rubiaceæ, 466.

Maclura, Urticaceæ, 528.
Mammillaria, Cactaceæ, 453.
Manettia, Rubiaceæ, 466.
Mangifera, Anacardiaceæ
Mantisia, Zingiberaceæ, 54
Marica, Iridaceæ, 547.
Maurandya, Scrophularia. 487
Melaleuca, Myrtaceæ, 447.
Metrosideros, Myrtaceæ, 447
Mormodes, Orchidaceæ, 540
Morna, Compositæ, 469.

Nerine, Amaryllidaceæ, 544.

Nerium, Apocynaceæ, 497.
Nyctanthus, Jasminaceæ, 499.

Opuntia, Cactaceæ, 453.
Osbeckia, Melastomaceæ, 448.

Palavia, Malvaceæ, 421.
Paliurus, Rhamnaceæ, 441.
Pergularia, Asclepiadaceæ, 498.
Petræa, Verbenaceæ, 488.
Petunia, Solanaceæ, 496.
Phlomis, Labiatæ, 487.
Phœnix, Palmaceæ, 531.
Phormium, Liliaceæ, 551.
Phylica, Rhamnaceæ, 441.
Physianthus, Asclepiada. 498.
Physostegia, Labiatæ, 487.
Phyteuma, Campanulaceæ, 474.
Piplanthus, Leguminosæ, 444.
Pistacia, Anacardiaceæ.
Plectranthus, Labiatæ, 489.
Poinsettia, Euphorbiaceæ, 519.
Pomaderris, Rhamnaceæ, 441.
Raphiolepis, Rosaceæ, 445.
Renanthera, Orchidaceæ, 540.
Rhipsalis, Cactaceæ, 453.
Rhodanthe, Compositæ, 469.
Rhodiola, Crassulaceæ, 459.
Rhodochiton, Scrophularia. 487.
Rœmeria, Papaveraceæ, 409.
Rondeletia, Rubiaceæ, 466.

Sagus, Palmaceæ, 531.
Salisburia, Coniferæ, 529.
Saracha, Solanaceæ, 496.
Schizanthus, Solanaceæ, 496.
Schotia, Leguminosæ, 444.
Scorpiurus, Leguminosæ, 444.
Scorzonera, Compositæ, 469.
Scottia, Leguminosæ, 444.
Siphonia, Euphorbiaceæ, 519.
Sparaxis, Iridaceæ, 547.
Spartium, Leguminosæ, 444.
Sprekelia, Amaryllidaceæ, 544.
Stanhopea, Orchidaceæ, 540.
Stenochia, Compositæ, 469.
Stenochilus.
Sternbergia, Amaryllidaceæ.544
Strelitzia, Musaceæ.
Streptocarpus, Bignoniaceæ, 485.

Tabernæ montanæ, Apocyna. 497.
Tacsonia, Passifloraceæ, 456.
Talaunia, Magnoliaceæ, 401.
Tamus, Dioscoreaceæ, 548.
Thysanotus, Liliaceæ, 551.
Trapa, Hydrocharidaceæ, 538.

Vanda, Orchidaceæ, 540.
Victoria, Nymphæaceæ, 407.

Wachendorfia, Liliaceæ, 551.
Westeria, Leguminosæ, 444.

Xeranthemum, Compositæ, 469
Xylaphylla, Euphorbiaceæ, 519

Zygopetalum, Orchidaceæ, 540

THE FLORA,

OR

PRACTICAL BOTANIST'S COMPANION

CONTAINING

GENERIC AND SPECIFIC

DESCRIPTIONS

OF THE

PLANTS OF THE UNITED STATES

CULTIVATED AND EXOTIC

SECTION III.

GENERA OF PLANTS.

CLASS I. MONANDRIA.

ORDER I. MONOGYNIA.

SALICOR″NIA. Calyx inflated entire, 3 or 4-sided, obconic; corolla 0; style 2-cleft; seed 1, enclosed in the calyx. (samphire.)

HIPPU′RIS. Calyx superior, obsolete, with a 2-lobed margin; corolla 0; seed 1; stigma simple; style in the groove of the anther. (mare's-tail.)

CAN″NA. Anthers adhering to the petal-like filaments; styles thick, club-shaped; stigma obtuse, linear. (Indian-reed.)

THA′LIA. Anther attached to the filaments; style depressed; stigma gaping.

ORDER II. DIGYNIA.

BLI′TUM. Calyx 3-cleft, or 3-parted, berry-like; corolla 0; seed 1, immersed in the calyx. (blite.)

CAL″ITRI′CHE. Calyx 0; petals 2, resembling a calyx; seeds 4, naked.

CORISPER″MUM. Calyx 2-leaved; corolla 0; seed 1.

CLASS II. DIANDRIA.

ORDER I. MONOGYNIA.

A. *Corolla* 1-*petalled, inferior, regular; seeds in a drupe or nut.*

OR″NUS. Calyx 4-parted; corolla 4-parted, petals long and ligulate. Two barren filaments; nut winged; fruit a capsule. (flowering ash.)

ELYTRA′RIA. Calyx 4 or 5-parted; corolla 5-cleft; capsule 5-valved, 2-seeded; seeds adhering to a dissepiment, contrary to the valves.

LIGUS″TRUM. Calyx 4-toothed; corolla with 4 ovate divisions; berry 1 or 2-celled, 2 or 4-seeded. (prim.)

CHIONAN″THUS. Calyx 4-parted; corolla 4-parted, sometimes more, tube short, with very long divisions; nucleus of the drupe striate-fibrous. (fringe tree.)

OLE′A. Corolla 4-cleft, with obovate divisions; drupe 1-seeded.

JASMI′NUM. Corolla salver-form, 5 to 8-cleft; berry 2-seeded, each seed solitary, arilled. (jasmine.) Ex.

SYRIN″GA. Corolla salver-form; capsule 2-celled. (lilac.) Ex.

B. *Corolla* 1-*petalled, inferior, irregular; seeds in capsules.*

VERON″ICA. Calyx 4-parted; corolla cleft into 4 lobes, lower division smaller; capsule obcordate, few-seeded, 2-celled. (speedwell.)

LEPTAN″DRIA. Calyx 5-parted, segments acuminate; corolla tubular-campanulate, border 4-lobed, a little ringent, lower segment narrow; stamens and at length the pistils much exserted; capsule ovate, acuminate, opening at the top. (culver's physic.)

GRATIO′LA. Calyx 5-parted, often with 2 bracts at the base; corolla irregular, resupinate, 2-lipped, upper lip 2-lobed, lower one equally 3-cleft; stigma 2-lipped; capsule 2-celled, 2-valved. (hedge-hyssop.)

LINDER″NIA. Calyx 4-parted; corolla resupinate, tubular, 2-lipped, upper lip short, reflexed, emarginate, lower one trifid, unequal, filaments 4, the 2 longer ones forked and barren; capsule 2-celled, 2-valved, the dissepiment parallel to the valves.

CATAL″PA. Corolla 4 or 5-cleft, somewhat inflated, bell-form; calyx 2-parted, or 2-leaved; stigma 2-lipped; capsule cylindric, 2-celled. (catalpa-tree.)

HEMIAN″THUS. Calyx tubular, cleft on the under side, border 4-toothed; upper lip of the corolla obsolete, lower 3-parted, intermediate segments ligulate, longer, incurved; stamens with 2-cleft filaments, the side branches bearing anthers; capsule 1-celled, 2-valved, many-seeded.

JUSTI′CIA. Calyx 5-parted, often with 2 bracts at the base; corolla irregular, labiate, upper lip emarginate, lower lip 3 cleft.

UTRICULA′RIA. Calyx 2-leaved, equal; corolla ringent, lower lip spurred at the base; filaments incurved; stigma divided.

PINGUIC″ULA. Corolla labiate, spurred; calyx 5-cleft; capsule 5-celled.

MICRAN″THEMUM. Calyx 4-parted; corolla 4-parted, the upper lip smaller; filament incurved, shorter than the corolla, capsule 1-celled, 2-valved; seeds striate.

C. *Corolla* 1-*petalled, inferior, irregular, seeds naked.*

MONAR″DA. Calyx cylindric, striated, 5 toothed; corolla ringent, tubular, upper lip lance-linear, involving the filaments, lower lip reflexed, 3-lobed. (Oswego tea, mountain mint.)

LYCO′PUS. Calyx tubular, 5-cleft or 5-toothed; corolla tubular, 4-cleft, nearly equal, upper division broader and emarginate; stamens distant; seeds 4, retuse (water horehound.)

SAL″VIA. Calyx tubular, striated, 2-lipped, upper lip 2 to 3-toothed, lower lip 2-cleft; corolla ringent, upper lip concave, lower lip broad, 3-lobed, the middle lobe the largest, notched; stamens with two spreading branches, one of which bears a 1-celled anther; germ 4-cleft; style thread-shaped, curved; seeds 4, in the bottom of the calyx. (sage.)

Collinso'nia. Calyx tubular, 3-lipped, upper lip 3-toothed; corolla funnel-form, unequal, under lip many-cleft, capillary; one perfect seed. (horse-balm.)

Rosmari'nus. Corolla ringent, upper lip 2-parted; filaments long, curved, simple, with a tooth. (rosemary.) Ex.

D. *Corolla superior*

Circæ'a. Calyx 2-leaved or 2-parted; corolla 2-petalled; capsule hispid, 2-celled, not gaping; cells 1 or 2-seeded, seeds oblong. (enchanter's nightshade.)

ORDER II. DYGYNIA.

Anthoxan″thum. Calyx of two, egg-shaped, pointed, concave, chaffy scales, 1-flowered; corolla of two equal husks, shorter than the calyx, awned on the back; an internal corolla or nectary, consisting of two, egg-shaped, minute scales; stamens longer than the corolla; anther oblong, forked at both ends; germ superior; seed 1. (sweet vernal grass.)

Cryp″ta. Peplis. Calyx 2-sepalled, inferior; corolla 2 or 3-petalled, closed; styles none; stigmas 2 or 3, very minute; capsule 2 or 3-celled, 2 or 3-valved; cells 4 or 5-seeded; seeds sub-cylindric, striate, incurved. (mud-purslane.) *The corolla appears like a capsule with an aperture at the top, when examined without a lens.*

Erian″thus. Glumes 2, valves nearly equal, villose at the base; paleas 2, unequal; inner glume bearing a long awn near the summit. *S.*

ORDER III. TRIGYNIA.

Pi'per. Spadix simple and slender, calyx and corolla wanting. Fruit a berry, globose. (pepper.) Ex.

CLASS III. TRIANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers superior.*

I'ris. Calyx spatha, 2 or 3-valved; corolla 6-parted, divisions alternately reflexed; stigmas 3, petal-like; style short; capsule 3-celled. (flower-de-luce, iris or flag.) Ex.

Fe'dia. Calyx 3 to 6-toothed, permanent; corolla tubular, 5-cleft or 5-parted; nut or capsule 2 or 3-celled; seed naked, or crowned with a tooth. (lamb-lettuce.)

Dila'tris. Perianth superior, 6-parted, segments unequal; stamens 3; style declining; stigma minutely 3-lobed; capsule 3-celled, truncated, many-seeded. (red-root.)

Plectri'tis. Calyx with the margin straight, entire; corolla with the tube short-spurred at the base, gibbose before, limb 5-cleft, 2-lipped; capsule 1-celled, 2-winged.

Valerianel″la. Calyx with the limb toothed, persistent; corolla not spurred, regular, 5-lobed; stigma sub-trifid; capsule 3-celled, sub-membranous, crowned with he limb of the calyx. (wild lamb-lettuce.)

Gladio'lus. Spatha 2-valved; corolla -parted, two divisions much smaller, upper divisions broadest; style long and slender; stigmas 3; capsule triangular, 3 celled, many-seeded.

Valeria'na. Corolla monopetalous, 5 cleft, horned at the base; seed 1, crowned with a feathery pappus. Ex.

Cro'cus. Spatha radical; corolla funnel form, with a long slender tube; stigma deep-gashed, crested.

Ix″ia. Spatha 2 or 3-valved, ovate, short, corolla 6-parted or 6-petalled, sometimes tubular; stamens straight or incurved; stigmas sub-filiform. (blackberry-lily.)

Phyllac″tis. Involucrum 1-leaved, sheathing; calyx marginal, minute; corolla 3-cleft; seed 1; styles and stamens exsert.

Apte'ria. Calyx 0; corolla monopetalous, wingless, bell-tubular, with the margin 6-toothed, alternately smaller; capsule 1 celled, valveless; seeds numerous and minute.

Boerhaa'via. Calyx tubular, margin entire; corolla 1-petalled, campanulate, plaited; nut 1, invested by the permanent calyx, naked or tubercled, 5-grooved, obconic

Calyme'nia. See **Allio'nia.**

B. *Flowers inferior.*

Commeli'na. Sheath cordate; calyx 3-leaved; corolla 3-petalled, sub-equal; 3 barren filaments—sometimes the whole 6 filaments bear anthers; stigma simple; nectaries 3, cross-form, inserted on peculiar filaments; capsule sub-globose, 3-celled, cells 2-seeded or empty. (day-flower.)

Schol″lera. Spatha 1-flowered; corolla long-tubular, border 6-parted, with the stamens on the divisions; filaments equal.

Heteranthe'ra. Calyx a 2 or 3-flowered spatha; corolla dull-colored, membranaceous, with a long slender tube, border 4 to 6-parted; anthers 3, 2 of them attached to the divisions of the corolla, the other attached to the top of the style, and much larger; stigma sub-capitate, 1-sided; capsule 3-celled, many-seeded, dehiscent at the angles. *This genus is intermediate between the classes Triandria and Gynandria.*

Sye'na. Calyx 3-leaved; corolla 3-petalled; anthers oblong; capsule 1-valved, 3 celled. S.

Sti'pulici'da. Calyx 5-parted; corolla 5-petalled; stigmas 3; capsule 1-celled, 3-valved. S.

Polycne'mum. Calyx 3-sepalled; petals calyx-like; capsule 1-seeded, membranaceous, not opening, covered by the calyx Stamens vary from 1 to 5. S.

C. *Flowers with glumes. Sedges.*

Duli'chium. Spikes sub-racemed, axillary; spikelets linear-lanceolate, sub-compressed; glumes distichus, sheathing; style very long, bifid, base persistent; nu bristled at the base.

Cype'rus. Scales imbricated 2-ways ovary without bristles; spikelets compressed, distinct.

Limnet″is. Glume 2-valved, compressed one valve keeled and longer than the other paleas 2-valved, awnless, unequal; flowers in unilateral spikes, somewhat imbricated in 2-rows. (salt-grass.)

Kyllin″ga. Flowers distinct, disposed in a roundish, sessile, sub-imbricated spike; glumes 2-valved, 1-flowered; paleas 2, longer than the glumes. (bog-rush.)

Oryzop″sis. Glume 1-flowered, 2-valved; valves membranaceous, nearly equal, lax, obovate, awnless; paleas 2, coriaceous, cylindric ovate, hairy at the base, the lower one awned at the tip; scales linear-elongated; flowers panicled. (mountain rice.)

Rhynchos″pora. Glumes fascicled into a spike, the lower ones empty; seed 1, crowned with a persistent style; bristles surrounding the base. (false bog-rush.)

Schœ′nus. Glumes fascicled into a spike, the lower ones empty; style deciduous; seeds naked.

Scir″pus. Glume 1-valved, 1-flowered, imbricated on all sides; seed or nut naked or bristled at the base. (club-rush.)

Mie′gia. Flowers polygamous, panicled; glume 2-valved, many-flowered, short and unequal; paleas 2, unequal, the larger one acuminate; style very short, 3-cleft, plumose; nectary 3-parted, divisions lanceolate, acute, as long as the germ, large, acuminate. (cane.) *S.*

Nar″dus. Glume 1-flowered, 1-valved; palea 1, included in the calyx; stigma 1. Flowers spiked, alternating and sessile. (mat-grass.)

Xy′ris. Calyx a cartilaginous glume, 2 or 3-valved, in a head; corolla 4-petalled, equal, crenate; capsule 3-valved, many-seeded. (yellow-eyed grass.)

ORDER II. DYGYNIA.

A. *Spikelets 1-flowered; corollas without abortive rudiments of flowers at the base.* [*Calyx and corolla different in texture.*]

Leer″sia. Calyx 0; corolla 2-valved, closed; valves compressed, boat-shaped; nectary obovate, entire, collateral; stamens varying in number. (cut-grass.)

Mil″ium. Glume 2-valved, naked, beardless; paleas 2, oblong, concave, shorter than the glume, awnless; seed 2-horned; flowers panicled. (cane.)

Pas″palum. Glume in 2 membranaceous, equal, roundish valves; paleas awnless, cartilaginous, of the form of the glume; stigma plumose, colored; nectary lateral; flowers in unilateral spikes.

Piptathe′rum. Glume membranaceous, longer than the cartilaginous, oval paleas; lower valve awned at the tip; nectary ovate, entire; seed coated.

Aris″tida. Glume 2-valved, membranaceous, unequal; paleas 2-valved, pedicelled, sub-cylindric, lower valve coriaceous, involute, 3-awned at the tip, upper valve very minute or obsolete; nectary lateral. (beard-grass.)

Sti′pa. Glume 2-valved, membranaceous; paleas 2-valved, coriaceous, valves involute, truncate; awn terminal, long, caducous; seed coated. (feather-grass.)

Sac″charum. Calyx involucred, with long wool at the base, 2-valved; corolla 1 or 2-valved; stamens 1 to 3. (sugar-cane.)

[*Calyx and corolla of similar texture—flowers in spreading panicles.*]

Agros″tis. Calyx herbaceous, 2-valved, 1-flowered, valves acute, a little less than the corolla; corolla 2-valved, membranaceous, often hairy at the base; stigmas longitudinally hispid or plumose; florets spreading; nectary lateral; seed coated. (redtop.)

Muhlenberg″ia. Glumes 2, very minute, unequal, one scarcely perceptible, paleas 2, many times longer than the glumes, linear-lanceolate, nerved, hairy at base, the lower one terminating in a long awn.

Arun″do. Calyx 2-valved, unequal, membranaceous, surrounded with hair at the base, lower valve mucronate or slightly awned. Sometimes there is a pencil-form rudiment at the base of the upper valve (reed.)

[*Calyx and corolla of similar texture; flowers in compact panicles, often spikeform.*]

Phle′um. Calyx hard, 2-valved, equal, sessile, linear, truncate, bicuspidate; corolla enclosed in the calyx, 2-valved, awnless, truncate. (timothy-grass.)

Alopecu′rus. Glumes 2, equal, generally connate at the base; paleas 1-valved, utricle-like, cleft on one side, awned below the middle. (foxtail-grass.)

B. *Spikelets 1-flowered; corolla with 1 or 2 abortive rudiments of flowers at the base.* [*Calyx and corolla of similar texture.*]

Phala′ris. Calyx membranaceous, 2-valved, valves keeled, nerved, equal in length, including the 2-valved, pilose corolla; the corolla is shorter than the calyx and coriaceous; rudiments opposite, sessile, resembling valves; nectary lateral. (riband-grass, canary-grass.)

C. *Spikelets many-flowered.* [*Flowers in panicles; corolla unarmed.*]

Phragmi′tes. Calyx 5 to 7-flowered; the florets on villose pedicels, lower valve elongated, acuminate, involute, upper one somewhat conduplicate.

Bri′za. Spikelets heart-ovate, many-flowered; calyx chaffy, shorter than the 2-ranked florets; corolla ventricose, lower valve cordate, upper one orbicular, short. (quake-grass.)

Po′a. Spikelets oblong or linear, compressed, many-flowered; calyx shorter than the florets; corolla herbaceous, awnless, often scarious at the base; lower valve scarious at the margin. (spear-grass.)

Sor″ghum. Florets in pairs, one perfect, with a 3-valved corolla and sessile, the other staminate or neutral, and pedicelled. (broom-corn.) Ex.

[*Flowers in panicles; corolla armed or mucronate.*]

Dac″tylis. Spikelets aggregated in unilateral heads, many-flowered; calyx shorter than the florets, with one large glume, keeled, pointed; corolla with the lower valve keeled, emarginate, mucronate, upper valve sub-conduplicate. (orchard-grass.)

Kœle′ria. Glume 2 to 4-flowered, shorter than the florets; lower palea mucronate, or with a short bristle a little below the tip.

Festu′ca. Spikelets oblong, more or less terete, at length compressed, acute at each end; florets sub-terete; glumes unequal, shorter than the lower florets, keeled, acute; paleas lanceolate, the lower one acuminate or rounded at the extremity. (fescue-grass.)

Bro′mus. Glumes 2, shorter than the florets; spikelets terete, 2-ranked, many-flowered; outer paleas bifid, awned below the tip, inner one pectinate-ciliate, sub-conduplicate. (chess, broom-grass.)

Dantho′nia. Glumes 2 to 5-flowered, longer than the florets, cuspidate; palea, bearded at the base, lower one 2-toothed, with a twisted awn between the teeth, upper one obtuse, entire; panicle spiked. (wild-oats.)

Ai′ra. Glumes 2, rarely 3-flowered, beardless, 2-valved, equal to the florets, or shorter; one of the florets peduncled; paleas 2, equal, enclosing the seed when ripe, outer one usually awned; panicle compound.

Ave′na. Calyx 2-valved; 2, 3, or many-flowered; corolla with valves mostly bearded at the base, lower one torn, with a twisted awn on the back; glumes membranaceous, and somewhat follicle-like; seed coated. (oats.) Ex.

[*Flowers in spikes.*]

Lo′lium. Calyx 1-leafed, permanent, many-flowered; florets in many-flowered, 2-rowed, simple, sessile spikelets on a rachis, lower valve of the corolla herbaceous-membranaceous, mucronate, or bristled at the tip. (darnel-grass.)

Trit″icum. Calyx 2-valved, about 3-flowered; florets sessile on the teeth of the rachis, obtusish and pointed; glumes beardless, or interruptedly bearded. (wheat.) Ex.

Sesle′ria. Glumes 2 to 5-flowered; paleas 2; stigmas sub-glandular; base of the spike bracted or involucred. (moor-grass.) *S.*

Meli′ca. Glumes unequal, 2 to 5-flowered, membranaceous, nearly as long as the florets, of which the upper are incomplete and abortive; scales truncate, fimbriate; seed loose, not furrowed; panicle simple or compound. (melic-grass.)

Seca′le. Calyx 2-valved, 2 or 3-flowered; spikelets sessile on the teeth of the rachis, with the terminal floret abortive; calyx 2-valved; glumes subulate, opposite, shorter than the florets; corolla with the lower valve long awned. (rye.) Ex.

Flowers polygamous. [*In panicles.*]

Pan″icum. Calyx 2-valved, 2-flowered; the lower glume generally very small; the lower floret abortive, 1 or 2-valved, the lower valve resembling the calyx, the upper one membranaceous; perfect floret with cartilaginous valves, unarmed. (cock-foot grass, panic-grass.)

Hol″cus. Glumes 2-valved, 2-flowered, nearly equal; paleas 2; florets dissimilar, polygamous, one awned, the other awnless, without any imperfect one between them; panicles contracted.

[*In spikes.*]

Hor″deum. Spikelets 3 at each joint of the rachis, 1 or 2-flowered, all perfect, or the lateral ones abortive; glume lateral, subulate; perfect flower with a 2-valved corolla, lower valve ending in a bristle; seed coated. (barley.) Ex.

Androp″ogon. Spikelets in pairs, involucred, the lower one staminate or neutral, on a bearded pedicel; glumes and paleas often very minute, or wanting; upper spikelets sessile, 1-flowered, perfect; glumes subcoriaceous; paleas 2, shorter than the glumes, membranaceous, lower valve generally awned. (beard-grass.)

Pennise′tum. Inflorescence, a compound cylindrical spike; spikelets 2-flowered, invested with an involucrum of 2 or more bristles; glumes 2, unequal, herbaceous; superior florets perfect; paleas cartilaginous. (bristled panic.)

Rotbol″lia. Rachis jointed, somewhat terete, often filiform; calyx ovate-lanceolate, flat, 1 or 2-valved, 1 or 2-flowered; florets alternate on a flexuous rachis. *S.*

Monoce′ra. Flowers in 2 rows on one side of the rachis; glumes 3, many-flowered, valves awned below the tip. Perfect flowers have 2 paleas, unequal, outer valve awned below the tip. Neutral flowers have 2 awnless paleas. *S.*

ORDER III. TRIGYNIA.

Mollu′go. Calyx 5-leaved, colored within; corolla 0; capsule 3-celled, 3-valved. (carpet-weed.)

Leche′a. Calyx 3-sepalled; petals 3, linear; stigmas 3, plumose; capsule 3-celled, 3-valved, with 3 inner valvelets; seed 1.

Mon″tia. Calyx 2 to 3-sepalled; petals 5, sub-connate at the base, 3 rather small; stamens on the claws of the petals, mostly before the 3 smallest; styles short, reflexed; capsules 1-celled, 3-valved, 3-seeded.

Polycar″pon. Calyx 5-sepalled; petals 5, very short, emarginate, permanent; capsule ovate, 1-celled, 3-valved. *S.*

Proserpina′ca. Calyx 3-parted, superior; corolla 0; fruit a hard nut, 3-sided, 3-seeded, crowned by the calyx. (mermaid-weed.)

CLASS IV. TETRANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers superior.* [*1-petalled.*]

Allio′nia. Common calyx oblong, simple, 3-flowered, proper calyx obsolete; corolla irregular; receptacle naked.

Cephalan″thus. Inflorescence in a head; general calyx none, proper calyx superior, minute, angular, 4-cleft; corolla funnel-form; receptacle globular, hairy; capsule 2 to 4-celled; seed solitary, oblong. (button-bush.)

Dip″sacus. Flowers in an ovate or roundish head; common calyx polyphillous, foliaceous, proper calyx monophyllous, superior; corolla tubular, 4-cleft; seed solitary; receptacle conic, chaffy. (teasel.)

Ga′lium. Calyx 4-toothed; corolla flat, 4-cleft; fruit dry; seeds 2, roundish; leaves stellate. (bedstraw.)

Ru′bia. Calyx small, 4-toothed, superior; corolla bell-form; filaments shorter than the corolla; fruit pulpy. (madder.)

Scabio′sa. Involucre many-leaved; calyx double, superior; corolla tubular; filaments longer than the limb of the corolla; seed naked, crowned by the calyx.

Dio′dia. Calyx with the tube ovate, 2 or 4-toothed; corolla funnel-form, 4-lobed; capsule ovate, 2-celled.

Hedyo′tis. Calyx 4-toothed; corolla tubular, bearded at the throat, 4-parted; capsule ovate, 2-celled, many-seeded.

Housto′nia. Calyx 4-toothed; corolla salver form, 4-cleft; capsule 2-celled, many-seeded, opening transversely. (innocence.)

Spermaco′ce. Corolla funnel-form, 4-cleft; capsule 2-celled; seeds 2, 2-toothed. *S.*

Mitchel″la. Calyx 4-toothed; corollas 2 on each germ, funnel-form, tube cylindric, limb 4-parted, spreading, villose on the inside; stamens scarcely exsert, stigma 4-cleft; berry double, 4-seeded. (partridge-berry.)

Linnæ′a. Calyx double, that of the fruit 2-leaved, inferior, that of the stigma globose; berry 3-celled, dry. (twin-flower.)

Cor″nus. Calyx 4-toothed; drupe with a 2-celled nut. Some species have a 4-leaved involucrum. (dogwood, false box.)

Ludwig″ia. Calyx 4-parted, persistent; corolla sometimes 3; capsule quadrangular, 4-celled, inferior, many-seeded.

Eleag″nus. Calyx 4-cleft, bell-form, colored within; anthers sub-sessile; style short; drupe 1-seeded, marked with 8 furrows. *S.*

Polypre′mum. Calyx 4-parted; corolla 4 cleft, wheel-form, bearded at the orifice, stamens included; capsule compressed, 2-celled, many-seeded. *S.*

B. *Flowers inferior.*

Planta′go. Calyx 4-cleft; corolla 4-cleft, reflex; capsule 2-celled, opening transversely; stamens exsert, very long. (plantain, ribwort.)

Centaurel″la. Calyx 4-parted; corolla sub-campanulate, segments somewhat erect; stigma thick; capsule 1-celled, 2-valved, many seeded, surrounded by the persistent calyx and corolla.

Ex″acum. Calyx deeply 4-parted; corolla 4-cleft, tube globose; capsule bisulcate, 2-celled, many-seeded.

Swer″tia. Calyx flat, 4 or 5-parted; corolla 4 or 5-parted, tube short, border spreading, with 2 pores at the base of each; style short; stigma 2; capsule 1-celled, 2-valved.

Frase′ra. Calyx deeply 4-parted; corolla 4-parted, spreading, segments oval, with a bearded orbicular gland in the middle of each; capsule compressed, partly emarginate, 1-celled; seeds few, large, imbricate, with a membranous margin.

Ammann″ia. Calyx bell-tubular, plaited, 8-toothed; petals 4 or none, on the calyx capsule 4-celled, many-seeded (sometimes 2-celled and 8-stamened). (tooth-cup.)

Pte′lea. Calyx 4-parted; petals 4, spreading; stigmas 2; samara compressed, orbicular, 2-celled, 2-seeded.

Ly′cium. Corolla tubular, having the throat closed by the beards of the filaments; stamens often 5; berry 2-celled, many seeded. (matrimony.)

Krame′ria. Calyx none; corolla 4 or 5-petalled; nectary 4-leaved; anthers perforated; drupe prickly. *S.*

Cal″licar″pa. Calyx 4-cleft; corolla 4-cleft; berry 4-seeded. *S.*

Rivi′na. Corolla 0; perianth 4-parted, persistent; stamens 4, 8, and 12; style 1; berry 1-seeded; seeds lentiform, scabrous.

Icto′des. General calyx a spatha; spadix simple, covered with flowers; perianth corolla-like, deeply 4-parted, permanent, becoming thick and spongy; style pyramid-form, 4-sided; stigma simple, minute; berries globose, 2-seeded, enclosed in the spongy spadix receptacle. (skunk cabbage.)

Sanguisor″ba. Calyx colored, 4-lobed, with 2 scales at the base; capsule 4-sided, 1 or 2 celled. (burnet saxifrage.)

Alchemil″la. Calyx 8-cleft, segments spreading, alternately smaller; style lateral from the base of the germ; fruit surrounded by the calyx. (ladies' mantle.)

ORDER II. DIGYNIA.

Hamame′lis. Involucrum 3-leaved; perianth 4-leaved or 4-cleft; petals 4, very long, linear; nut 2-celled, 2-horned. (witch hazel.) Flowers in autumn, and perfects its seed the following spring.

Apha′nes. Calyx 2-cleft, alternate, segments minute; petals none; stamens minute; styles 2; seeds 2, covered by the converging calyx, one of them often abortive; stamens 1, 2, and 4. *S.*

ORDER IV. TETRAGYNIA.

I′lex. Calyx minute, 4 or 5-toothed; corolla 4-parted; style 0, stigmas 4; berry 4-celled, cells 1-seeded. (holly.)

Nemopan″thes. Flowers abortively diœcious or polygamous; calyx small, scarcely conspicuous; petals 5, distinct, oblong-linear, deciduous; ovary hemispheric, style none; stigmas 3-4 sessile; berry sub-globose, 3-4 celled.

Rup″pia. Calyx 0; corolla 0; seeds 4, pedicelled.

Sagi′na. Calyx 4 or 5-parted; petals 4—5, or none; stamens 4 or 5; capsule 4 or 5-valved, 1-celled, many-seeded.

Potamoge′ton. Flowers on a spadix; calyx and corolla 0; nuts 4, 1-seeded, sessile

CLASS V. PENTANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers 1-petalled, inferior; seeds naked in the bottom of the calyx.*

ROUGH-LEAVED PLANTS.

Myoso′tis. Calyx half 5-cleft, or 5-cleft; corolla salver-form, curved, 5-cleft, vaulted, the lobes slightly emarginate, throat closed with 5 convex converging scales; seeds smooth or echinate (scorpion-grass.)

CYNOGLOS″SUM. Calyx 5-parted; corolla short, funnel-form, vaulted, throat closed by 5 converging, convex processes; seeds depressed, affixed laterally to the style. (hound-tongue.)

LYCOP″SIS. Calyx 5-cleft; corolla funnel-form, throat closed with ovate, converging scales; seeds perforated at the base.

BORA′GO. Corolla wheel-form, the throat closed with rays. (borage.) Ex.

ANCHU′SA. Calyx 5-parted; corolla funnel-form, vaulted, throat closed; seeds marked at the base, and their surface generally veined. (bugloss.) Ex.

SYM″PHYTUM. Limb, or upper part of the corolla tubular, swelling, the throat closed with subulate rays. (comfrey.) Ex.

HELIOTRO′PIUM. Calyx tubular, 5-toothed; corolla salver-form, 5-cleft, with teeth or folds between the divisions, throat open; spikes recurved, involute. (turnsole.)

LITHOSPER″MUM. Calyx 5-parted, segments acute; corolla funnel-form, border 5-lobed, orifice naked; stamens within the tube of the corolla, stigma obtuse; seeds hard and shining. (gromwell.)

ONOSMO′DIUM. Calyx deeply 5-parted, segments linear; corolla somewhat tubular, campanulate, border ventricose, half 5-cleft, segments connivent, acute; anthers sessile, included; styles much exserted; nuts imperforate, shining.

ROCHEL″IA. Calyx 5-parted; corolla salver-form, throat closed with converging scales; nuts prickly, compressed, affixed laterally to the style.

BATSCH″IA. Calyx deep 5-parted; corolla salver-form, with a bearded ring within the straight tube. (false bugloss.)

PULMONA′RIA. Calyx prismatic, 5-cornered, 5-toothed; corolla funnel-form, border 5-lobed; tube cylindrical. (lung-wort.)

ECH″IUM. Calyx 5-parted; segments subulate, erect; corolla bell-form, with an unequal 5-lobed border, the lower segment acute and reflexed. (viper's bugloss.)

B *Flowers 1-petalled, inferior; seeds covered.* [*Capsule 1-celled.*]

ANAGAL″LIS. Calyx 5-parted; corolla wheel-form, deeply 5-lobed; capsule opening transversely, globose, many seeded; stamens hairy. (scarlet pimpernel.)

LYSIMA′CHIA. Calyx 5-cleft; corolla wheel-form, 5-cleft; capsule 1-celled, globular, 5 or 10-valved, mucronate; stigma obtuse. (In some species the filaments are united at the base.) (loose strife.)

PRIMU′LA. Umbellets involucred; calyx tubular, 5-toothed; corolla salver-form, 5-lobed, tube cylindric, throat open, divisions of corolla emarginate; capsule 1-celled, with a 10-cleft mouth; stigma globular. (primrose, cowslip.)

DODECATH″EON. Calyx 5-cleft; corolla wheel-form, reflexed, 5-cleft; stamens in the tube; stigma obtuse; capsule oblong, opening at the apex. (false cowslip.)

SAMO′LUS. Calyx 5-cleft, semi-superior persistent; corolla salver-form, 5-lobed: stamens 5, antheriferous, opposite the segments of the corolla, and, 5 scales alternate with them, sterile; capsule 1-celled, 5-toothed, many-seeded.

MENYAN″THES. Calyx 5-parted; corolla funnel-form, limb spreading, 5-lobed, hairy within; stigma capitate. (buck-bean.)

VILLAR″SIA. Calyx 5-parted, 5-lobed, limb spreading, ciliate on the margin; stigma 2-lobed; glands 5, alternating with the stamens; capsule 2-valved, many-seeded. (water-shield.)

HOTTO′NIA. Calyx 5-parted; corolla salver-form, 5-lobed; stamens in the tube of the corolla; capsule globose. (feather-leaf.)

SABBA′TIA. Calyx from 5 to 12-parted, corolla wheel-form, from 5 to 12-parted; stigmas 2, spiral; capsule 2-valved, many seeded. (centaury.)

HYDROPHYL″LUM. Calyx 5-parted; corolla bell-form, 5-cleft, with 5 longitudinal grooves inside. (water-leaf.)

ELLIS″IA. Calyx deeply 5-parted; corolla smaller, funnel-form, 5-cleft, naked within; stamens not exsert, filaments smooth, anthers roundish; stigma 2-cleft; capsule 2 celled, 2-valved, 2-seeded; seeds punctate; capsule on the spreading calyx. *S.*

NEMOPHI′LA. Calyx 10-parted. alternate lobes reflexed; corolla sub-campanulate, 5-lobed the lobes emarginate, with nectariferous cavities at the base; stamens shorter than the corolla; capsule fleshy, 2-valved, 4-seeded.

ANDROSA′CE. Flowers in an involucred umbel; calyx 5-cleft, permanent; corolla salver-form, 5-lobed, tube ovate, orifices glandular; capsule 1-celled, globe-ovate 5-valved, many-seeded. *S.*

[*Capsule 2 to 5-celled.*]

VERBAS″CUM. Calyx 9-parted; corolla wheel-form, 5-lobed, somewhat irregular; stamens declined, hairy; capsules 2-celled, 2-valved, valves inflexed when ripened, many-seeded. (mullein.)

NICOTIA′NA. Calyx urceolate, sub-tubular, 5-cleft; corolla funnel-form, 5-cleft, limb plaited; stigma notched, capitate; stamens inclined; capsules 2-celled, 2 to 4-valved. (tobacco.)

OPHIORHI′ZA. Calyx 5-cleft; corolla 5-cleft, funnel-form; germ 2-cleft; stigmas 2, capsule mitre-form, 2-lobed, 2-celled, many-seeded. *S.*

CONVOL″VULUS. Calyx 5-parted, with or without 2 bracts; corolla funnel-form, plaited; stigma 2-cleft or double; cells of the capsule, 2 or 3; each 1 or 2-seeded. (bind-weed.)

IPO′MÆA. Calyx 5-cleft, naked; corolla funnel or bell-form, with 5 folds; stigma globe-headed, papillose; capsule 2 or 3-celled, many-seeded. (cypress-vine, morning-glory.)

LISIAN″THUS. Corolla tubular, ventricose, segments recurved; calyx bell-form keeled; stigma in a 2-lobed head; capsule 2-celled, 2-furrowed, 2-valved, seeds numerous, sub-imbricate, surrounded with a very small membranaceous margin. *S.*

Phace′lia. Calyx 5-parted; corolla somewhat bell-form, 5-cleft; stamens exserted; capsule 2-celled, 2-valved, 4-seeded.

Phlox. Calyx prismatic, 5-cleft, segments converging; corolla salver-form, 5-lobed, with a tube somewhat curved; filaments unequal in length, attached to the inside of the tube of the corolla; stigma 3-cleft; cells 1-seeded; seeds oblong, concave. (lichnidia.)

Datu′ra. Calyx tubular, angled, caducous, with a permanent orbicular base; corolla funnel-form, plaited; capsule 4-valved, 2-celled, and each cell half-divided; generally thorny. (thorn-apple.)

Aza′lea. Calyx 5-parted; corolla tubular, 5-cleft, somewhat oblique; stamens on the receptacle, declined; stigma declined, obtuse, usually ending with 5 short capillæ; capsule 5-celled, 5-valved, opening at the top. (wild honeysuckle.)

Diapen″sia. Capsule 3-celled, 3-valved, many-seeded; corolla salver-form; calyx 5-parted, bracted at base; stigmas 3.

Vin″ca. Corolla salver-form, twisted, border 5-cleft, with oblique divisions; throat 5-angled; seed naked, oblong; follicle-like capsules 2, erect, terete, narrow. Ex.

Physa′lis. Calyx 5-cleft; corolla wheel-form, 5-cleft; stamens converging; berry globose. (winter-cherry.)

Sola′num. Calyx 5 to 10-parted, permanent; corolla bell or wheel-form, 5-lobed, plaited; anthers thickened, partly united, with two pores at the top; berry containing many seeds, 2 to 6-celled. (potato, nightshade, bitter-sweet.)

Atro′pa. Corolla bell-form; stamens distant; berry globose, 2-celled, sitting on the calyx. (deadly nightshade.) Ex.

Cap″sicum. Corolla wheel-form; berry juiceless, inflated; anthers converging; calyx angular. (red pepper.)

Androce′ra. Calyx inflated, 5-cleft, caducous; corolla sub-ringent, wheel-form, 5-cleft; stamens unconnected, unequal, declined, one larger, and horn-formed; anthers with 2 terminal pores; style simple, declined, stigma not distinct; berry dry; seed without margins, rugose. *S.*

Spige′lia. Calyx 5-parted; corolla funnel-form, border 5-cleft, equal; anthers convergent; capsule 2-celled, 4-valved, many-seeded. Ex.

Hyocya′mus. Calyx tubular, 5-cleft; corolla funnel-form, irregular, lobes obtuse; stigma capitate; capsule ovate, covered with a lid.

Polemo′nium. Capsule bell-form, 6-cleft; corolla wheel-form, 5-parted; stamens inserted upon the 5 valves which close the orifice of the corolla.

C. *Flowers* 1-*petalled, superior.* [*Seeds in a capsule.*]

Campan″ula. Calyx mostly 5-cleft; corolla bell-form, closed at the bottom by valves bearing the flattened stamens; stigma 3 to 5-cleft; capsules 3 to 5-celled, opening by lateral pores. (bell-flower.)

Lobe′lia. Calyx 5-cleft; corolla irregular, often irregularly slitted; anthers cohering and somewhat curved; stigma 2-lobed; capsule 2 or 3-celled. (cardinal-flower, wild tobacco.)

Pinckne′ya. Capsule 2-celled, bearing the partition in the middle of the valves; calyx with 1 or two segments resembling bracts; filaments inserted at the base of the tube; seeds winged. *S.*

Psycho′tria. Tube of the calyx ovate, crowned; limb short, 5-lobed, 5-toothed or sub-entire; corolla funnel-form, short, 5-cleft; throat bearded; stigma 2-cleft; berry drupe-like. *S.*

Diervil″la. Calyx oblong, 5-cleft, with 2 bracts; corolla 5-cleft, twice as long as the calyx, funnel-form; border 5-cleft, spreading; stigma capitate; capsule oblong, 4-celled, naked, many-seeded. (bush honeysuckle.)

Chiococ″ca. Calyx 5-toothed; corolla funnel-form, equal; berries compressed, twinned, 2-seeded; seeds oblong, compressed.

Sympho′ria. Calyx minute, 4-toothed; corolla tubular, short, 4 or 5-lobed; stigma globose; berry crowned by the calyx; 4-celled, 4-seeded. (snow-berry.)

Lonice′ra. Calyx 5-toothed; corolla tubular, long, 5-cleft, unequal; stamens exsert; stigmas globose; berry 2 or 3-celled, distinct; seeds many. (trumpet honeysuckle.)

Xylos″teum. Calyx 5-toothed, with 2 conate bracts; corolla tubular, border 5-parted, nearly equal; berries in pairs, united at their bases, or combined in one; 2-celled. (fly honeysuckle, twin-berry.)

Trios″teum. Calyx 5-cleft, with linear divisions; corolla tubular, 5-lobed, gibbous at the base, berry 3-celled, 3-seeded. (fever root.)

Mirab″ilis. Corolla funnel-form, coarctate below; calyx inferior; germ between the calyx and corolla; stigma globular. (four o'clock.) Ex.

D *Flowers* 4 *to* 6-*petalled, inferior.* [*Seed in a capsule.*]

I′tea. Calyx 5-cleft, bell-form; petals linear, reflexed, spreading, inserted into the calyx; stigma capitate, 2-lobed; capsule 2-celled, 2-valved, many-seeded.

Impa′tiens. Calyx 2-leaved, deciduous, corolla irregular, spurred; anthers cohering at the top; capsule 5-valved, bursting elastically when ripe. (ladies' slipper, jewel-weed.)

Vi′ola. Calyx 5-leaved, or deeply 5-cleft; corolla irregular, with a horn behind (sometimes the horn is wanting, or a mere prominence); anthers attached by a membranous tip, or slightly cohering; capsule 1-celled, 3-valved. (violet.)

Ioni′dium. Ionia. (From Viola.) Calyx 5-sepalled, with bases extended; corolla somewhat 2-lipped, not spurred; stigma simple; capsule 1-celled, 3-valved, seeds on the middle valve.

Sole′a. Sepals 5, not auricled at the base, decurrent into a pedicel; petals nearly equal, the lower a little larger, and somewhat gibbous at the base; filaments with short, broad claws at the base.

Clayto′nia. Calyx 2-leaved, or 2-parted, the leaves valve-like; corolla 3-petalled, emarginate; stigma 3-cleft; capsule 1-celled, 3-valved, 3 to 5-seeded. (spring beauty.)

Ceano′thus. Petals scale-like, vaulted; claws long, standing in the 5-cleft, cup-form calyx; stigmas 3; berry or capsule dry, 3-grained, 3-celled, 3-seeded, 3-parted, opening on the inner side. (New-Jersey tea.)

Euon″ymus. Calyx 4 to 6-lobed, flat, covered at the base by a peltate disk; petals 4 or 6, spreading, inserted into the disk; capsule 3 to 5-celled.

Celas″trus. Calyx 5-lobed, flat; corolla spreading; capsule obtusely 3-angled, 3-celled, berry-like; valves bearing their partitions on their centres; cells 1 or 2-seeded; stamens standing around a glandular 5-toothed disk; style thick; stigma 3-cleft; seeds calyptred or arilled. (staff-tree, false bitter-sweet.)

Pickerin″ga. Calyx small, 5-parted, inferior; petals 5; anthers sagittate; style simple; capsule 1-celled, sub-globose, many-seeded. *S.*

Zi′ziphus. Calyx 5-cleft; petals 5, resembling scales, inserted into the glandular disk of the calyx; styles 2; drupe 2-celled, one cell often empty. *S.*

Gomphre′na. Calyx 5-leaved, colored, exterior one 3-leaved; 2 leafets converging, keeled; petals 5, villose (or rather no corolla); nectary cylindric, 5-toothed; capsule opening transversely, 1-seeded; style semi-bifid. (bachelor's button.) Ex.

Cyril″la. Calyx minute, sub-terminate, 5-parted; petals 5, stellate; stigmas 2 or 3; capsule 2-celled, 2-seeded, not opening; seed ovate, attached to the summit of a columella by a filament.

Ga′lax. Calyx 5-parted, permanent; corolla twice as long as the calyx, 5-petalled, affixed to the base of the stamens; anther-bearing tube, 10-cleft, the 5 shorter segments bearing the anthers; stigma 3-lobed; capsule 3-celled, 3-valved; seeds many, affixed to the columella.

[*Seed in a berry.*]

Vi′tis. Calyx 5-toothed, minute; petals cohering at the tip, hood-like, withering; style 0; stigma obtuse, capitate; berry 5-seeded, globular, often diœcious; seeds sub-cordate. (grape-vine.)

Ampelop″sis. (Cissus.) Calyx minute, 4 or 5-toothed; petals 4 or 5, unconnected above, caducous; germ surrounded with a glandular disk; berry 4 or 5-seeded.

Rham″nus. Calyx urceolate, 4 or 5-cleft; petals alternating with the lobes of the calyx, or wanting; stigma 2 or 4-cleft; berry 2 or 4-celled.

E. *Flowers 5-petalled, superior.*

Ri′bes. Calyx bell-form, 5-cleft (sometimes flat); corolla and stamens inserted on the calyx; style 2-cleft; berry many-seeded. (currant, gooseberry.)

Hede′ra. Petals oblong; berry 5-seeded surrounded by the calyx; style simple. (European ivy.) Ex.

F. *Flowers incomplete.*

Hamilto′nia. Polygamous; perianth turbinate, campanulate, 5-cleft; corolla 0; nectary with the disk 5-toothed, style 1; stigmas 2 or 3, germ immersed in the nectary, drupe 1-seeded, enclosed in the adhering base of the calyx. (oil nut.)

Siphony′chia. Sepals 5, linear; nectaries 5; style filiform; utricle 1-seeded, enclosed in the calyx.

The′sium. Perianth 4 or 5-cleft; stamens 4 or 5, villous externally; nut 1-seeded, covered by the persistent perianth. (false-toad flax.)

Any′chia. Sepals 5, united at the base, slightly concave, sub-saccate at the apex; sub-mucronate on the back; petals none; stamens 2 to 5; inserted on the base of the sepals; styles very short, distinct, or united at the base; utricle enclosed in the calyx; 1-seeded.

Glaux. Calyx campanulate, 5-lobed, colored; capsule globose, 5-valved, 5-seeded. surrounded by the calyx.

Celo′sia. Sepals 3, like a 5-petalled corolla; stamens united at the base by a plaited nectary; capsules opening horizontally; style 2 or 3-cleft. Ex.

ORDER II. DIGYNIA.

A. *Corolla 1-petalled, inferior*

Gentia′na. Calyx 4 or 5-cleft; corolla with a tubular base, bell-form, without pores, 4 or 5-cleft; stigmas 2, sub-sessile; capsule 1-celled, oblong; columellas 2, longitudinal; stamens but 4, when the divisions of corolla are 4. (gentian.)

Cuscu″ta. Calyx 4 or 5-cleft; corolla 4 or 5-cleft, sub-campanulate, withering; capsule 2-celled, dividing transversely at the base; seeds binate. (dodder.)

Gelsemi′num. Calyx small, 5-leaved; corolla funnel-form; border spreading, 5-lobed, nearly equal; capsule 2-celled; seeds flat.

Hydro′lea. Calyx 5-petalled; corolla wheel-form, or bell-form; anthers cordate; style long, diverging; stigma peltate; capsule 2-celled. *S.*

Dichon″dra. Calyx 5-parted, with spatulate segments; corolla short, bell-form, 5-parted; stigma peltate, capitate; capsule compressed, 2-celled, 4-seeded. *S.*

Evol″vulus. Calyx 5-parted; corolla bell-form; styles 2, 2-cleft; stigma simple.

Swer″tia. Corolla rotate, with 2 pores at the base of each segment.

B. *Corolla 5-petalled.*

Pa′nax. Polygamous, umbelled; involucrum, many-leaved; calyx 5-toothed. in the perfect flower, superior; berry cordate, 2 or 3-seeded; calyx in the staminate flower entire. (ginseng.)

Heuche′ra. Calyx inferior, 5-cleft; corolla on the calyx; petals small; capsule 2-beaked, 2-celled, many-seeded. (alum-root.)

C. *Corolla wanting.*

Salso′la. Perianth inferior, 5-cleft, persistent, enveloping the fruit with its base, and crowning it with its broad, scarious limb. (salt-wort.)

Atri′plex. Polygamous; calyx 5-leaved, 5-parted, inferior; style 2-parted; seed 1; in the pistillate flowers the calyx is 2-parted. (orach.)

Plane′ra. Calyx membranous, bell-form, 4 to 5-cleft; corolla 0; stigmas 2; capsule globose, membranous, 1-celled, 1-seeded; stamens 4 to 6; polygamous. *S.*

Ko′chia. Calyx inferior, bell-form, 5-cleft, forming a permanent band around the fruit, somewhat resembling 5 petals; corolla 0; style short; stigmas 2 or 3, long, simple. *S.*

Cel″tis. Perfect or polygamous; perianth inferior, 5-lobed; drupe globose, 1-seeded. (nettle-tree.)

Chenopo′dium. Calyx 5-parted, obtusely 5-angled, inferior; style deeply cleft; seed 1, lens-like, horizontal, invested by the calyx. (pigweed, oak of Jerusalem.)

Ul″mus. Calyx bell-form, withering; border 4 or 5-cleft; seed 1, enclosed in a flat, membranaceous samara; stamens vary from 4 to 8. (elm.)

Be′ta. Calyx 5-leaved; seed kidney-form within the fleshy substance of the base of the calyx. (beet.) Ex.

D. *Plants umbelliferous; flowers 5-petalled, superior; seeds 2.*

Eryn″gium. Fruit ovate, with bristles; petals oblong, equal, inflected; flowers aggregate, forming a head.

Œnan″the. Carpels 3-ribbed (rarely 5-ribbed); styles permanent; germ oblong-ovate, corticate, solid; apex denticulate; perianth slenderly 5-toothed; petals of the disk and florets of the umbel, cordate-inflexed, sub-equal; those of the ray florets large and deformed; general involucre mostly wanting. (waterdrop wort.)

Sanic″ula. Seeds with hooked prickles, oblong, solid; umbels nearly simple, capitate; flowers polygamous; involucre few-flowered; calyx 3-parted, permanent.

Dau′cus. Seeds striate on their joining sides, outer sides convex, having hispid ribs; involucrum pinnatifid; flowers sub-radiate, abortive in the disk. (carrot.)

Urasper″mum. [Osmorhiza.]* Seeds sub-linear, solid, acute-angled, not striate; ribs 5-acute; angles a little furrowed, hispid; the joining-sides furrowed, and attached to a 2-cleft columella-like receptacle; style subulate, permanent, rendering the seed caudate; involucrum none, or few-leaved; fruit stiped, oblanceolate, polished, part of it hispid. (sweet cicely.)

[*Seeds with wing-like ribs.*]

Herac″leum. Seeds with winged margins, and 3 ribs on the back, obtuse, 3 grooves on their outer sides; germ oval, emarginate at the apex; petals emarginate, inflexed; general involucre 0; partial involucre 3 to 7-leaved; flowers somewhat radiated. (cow parsley.)

Cni′dium. Involucre 1-leaved or 0; frui ovate, solid; ribs 5, acute, somewhat winged; intervals sulcate, striate.

Fer″ula. Calyx minute entire; petals oblong, sub-equal; fruit sub-oval, compressed, flat, wing-margined; carpels with 3 dorsal lines; intervals and joining sides striate, universal involucre caducous; partial ones many-leaved.

Angel″ica. Seeds with 3 ribs on their backs, and winged margins; intervals between the ribs grooved; germ oval, corticate; general involucrum none. (angelica.)

Pastina′ca. Seeds emarginate at the apex, somewhat winged; ribs 3, besides the wings; intervals striate; joining-sides 2-striate; germ oval, compressed; perianth calyx entire; petals entire, incurved, subequal; involucrum none. (parsnip.)

Tre′pocar″pus. Calyx 5-toothed; teeth subulate; petals obcordate, with inflexed margins; fruit pyramid-angled; commissure thick furrowed in the middle, filleted within.

Peuceda′num. Calyx minute, 5-toothed, petals oblong, incurved, equal; fruit oval compressed, surrounded with a winged margin, having 5 striæ on each carpel, and elevated intervals, joining-sides flat. (sulphur-wort.)

Archemo′ra. Calyx with the margin 5-toothed; petals obcordate, with inflexed divisions; fruit compressed at the back; sides dilate into a membranaceous margin, rather broader than the seeds · leaves pinnatifid; no general involucre, but many-leaved partial ones, flowers white.

Thas″pium. Calyx 5-toothed at the margin; petals oval, tapering into long inflexed apexes; fruit not contracted at the side, sub-oval; wings sub-equal, filleted at the joining edges; carpel terete; no general involucre, partial ones 3-leaved.

Ses″eli. Umbel globose; margin of the calyx 5-toothed; petals obovate; fruit oblong or oval, crowned with a reflexed style.

Seli′num. Fruit oval-oblong, compressed flat, striate in the middle; involucrum reflected; petals cordate, equal; calyx entire.

Ane′thum. Seeds flat or convex, 5-ribbed; germ lenticular, compressed; calyx and petals entire; involucrums none. (fennel, dill.) Ex.

[*Seeds with 3 ribs nearly equal.*]

Hydrocot″yle. Umbel simple; fruit compressed, sub-rotund. (marsh pennywort.)

Crith″mum. Fruit elliptical, ribbed, crowned; petals elliptical, acute, incurved equal; styles short or thick, with swelled bases. Ex.

Ca′rum. Seeds oblong-ovate, striate; petals carinate, emarginate, inflexed; involucrum about 1-leaved. (caraway.) Ex.

[*Seeds with 5 ribs nearly equal.*]

Co′nium. Seeds 5-ribbed; ribs at first crenate, with flat intervals between them, germ ovate, gibbous; perianth entire; petals unequal, cordate, inflexed; general involucrum about 3 to 5-leaved; partial ones mostly 3-leaved, unilateral. (poison hemlock.)

Cicu′ta. Seeds gibbous-convex ribs 5

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* Where two or more generic names are given, the pupil will understand that those within the brackets are synonymes of the other name

obtuse, converging, with intervening tuberculate-grooves and prominences; joining-sides flat; germ sub-globose, compressed laterally; calyx obsolete, 5-toothed; petals cordate, inflexed; partial involucrums 5 or 6-leaved, or wanting. (water hemlock,)

Si′um. Fruit somewhat prismatic, with 5 obtuse ribs; perianth minute; petals cordate, inflexed; involucres many-leaved, entire. (water-parsnip.)

Cryptotæ′nia. Calyx with the margin obsolete; petals obovate, sub-entire, narrowing into an inflexed point; fruit contracted at the side, linear-oblong, with a short slender foot-stem, and crowned with a straight style; and having many edging fillets, concealed, or nearly so; fruit-covering bifid at the apex; plant glabrous; leaves 3-cleft, segments curve-toothed.

Zi′zia. Margin of the calyx obsolete or very short, 5-toothed; petals oval, tapering into a long point: fruit contracted from the side, roundish, or oval; carpels terete-convex, a little flattish before; flowers yellow, rarely white or dark-purple.

Bupleu′rum. Calyx none; flowers regular; petals 5; styles very short, spreading; stigmas minute, simple; fruit egg-shaped, obtuse.

Si′son. Fruit ovate, striate; involucrums generally 4-leaved.

A′pium. Seeds convex externally; ribs 5, small, a little prominent; germ sub-globose; perianth entire; petals equal, roundish, inflexed at the apex; involucrum 1 to 3-leaved or wanting. (celery, parsley.) Ex.

Corian″drum. Seeds sub-spherical; germ spherical; perianth 5-toothed; petals cordate, inflexed, outer ones largest; involucrum 1-leaved or wanting. (coriander.) Ex.

Ligus″ticum. Germ oblong, with 5 acute ribs; intervals sulcate; universal and partial involucres. (lovage.)

Æthu′sa. Fruit ovate, sub-solid, having bark; ribs acute and turgid; intervals acute-angled; joining-sides flat, striate; involucrum 1-side, or none. (fools' parsley.)

ORDER III. TRIGYNIA.

A. *Flowers superior.*

Vibur″num. Calyx 5-parted or 5-toothed, small; corolla bell-form, 5-cleft, with spreading or reflexed lobes; stigmas almost sessile; berry or drupe 1-seeded. (snow-ball, sheep-berry, high cranberry.)

Sambu′cus. Calyx 5-parted or 5-cleft, small; corolla sub-urceolated, 5-cleft; stigma minute, sessile; berry globose, 1-celled, 3-seeded.

B. *Flowers inferior.*

Rhus. Calyx 5-parted; petals 5; berry 1-seeded, small, sub-globular. (sumach, poison-ivy.)

Staphyle′a. Calyx 5-parted, colored; petals 5 on the margin of a glandular 5-angled disk; capsules inflated, connate; nuts globular and cicatrized, 1 or 2 remaining in each capsule, though several appear as rudiments while in bloom. (bladder-nut.)

Lepu′rope′talon. Calyx 5-parted; petals 5, resembling scales, inserted into the calyx; capsule free near the summit, 1 celled, 1-valved. *S.*

ORDER IV. TETRAGYNIA.

Parnas″sia. Calyx inferior, permanent, 5-parted; corolla 5-petalled; nectaries 5-fringed, with stamen-like divisions; stigmas sessile; capsule 4-valved, 1 or 2-celled; seed membranaceous-margined. (parnassus grass, flowering plantain.)

ORDER V. PENTAGYNIA

Ara′lia. Umbellets involucred; perianth 5-toothed, superior; petals 5; stigmas sessile, sub-globose; berry crowned, 5 celled; cells 1-seeded. (spikenard, wild sarsaparilla.)

Li′num. Calyx 5-leaved or 5-parted, permanent; corolla 5-petalled, inferior, with claws; capsule 5 or 10-valved, 10-celled. seeds solitary, ovate, compressed; filaments spreading or united at the base. (flax.)

Sibbal″dia. Calyx 10-cleft, with the alternating segments narrower; petals 5, inserted in the calyx; styles attached to the germ laterally; nuts [illegible] in the bottom of the calyx.

Stat″ice. Calyx funnel-form, plaited, scarious; petals 5; stamens inserted on the petals; styles 5; flowers in spikes or heads; capsule 1-seeded, without valves.

ORDER VI. HEXAGYNIA.

Dros″era. Calyx inferior, deeply 5-cleft permanent; petals 5, marescent; anthers adnate; styles 6, or 1 deeply divided; capsule round, 1 or 3-celled, many-seeded, valves equalling the number of stigmas. (sundew.) The leaves of all the species are beset with glandular hairs resembling dew.

ORDER XII. POLYGYNIA.

Xanthorhi′za. Calyx 0; petals 5; nectaries 5, pedicelled; capsule half 2-valved, 1-seeded, about 5 in number. (yellow-root.)

Myosu′rus. Calyx inferior, of few, lanceolate, colored sepals; petals 5, with tubular, honey-bearing claws; filaments as long as the calyx; calyx spurred at the base.

CLASS VI. HEXANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers complete, having a calyx and corolla.*

Tradescan″tia. Calyx inferior, 3-leaved; corolla 3-petalled; filaments with jointed beards; capsules 3-celled, many-seeded (spider-wort.)

Leon″tice. Caulophyllum. Calyx of 3-6 sepals, naked externally; petals 6, unguiculate, with a scale on each claw; ovary superior, ventricose obovoid, obliquely beaked; seeds 2-4, globose, inserted in the bottom of the capsule, which is ruptured at an early period.

Ber″beris. Calyx inferior, 6-leaved petals 6, with 2 glands at the claw of each style 0; berry 1-celled, 2 or 4-seeded; stig ma umbilicate stamens spring up on being irritated. (barberry.)

CLEO′ME. Calyx 4-leaved, inferior; petals 4, ascending to one side; glands 3, one at each sinuate division of the calyx, except the lowest; stamens from 6 to 20, or more; capsule stipid or sessile, silique-like, often 1-celled, 2-valved. Does not belong to the class Tetradynamia by its natural or artificial characters. It has *no silique*, though the capsule appears, like a silique, until it is opened. (false mustard.)

GYNANDROP″SIS. Sepals 4, distinct, spreading; petals 4; receptacle linear, elongated; stamens with the lower part of the filaments, adnate to the receptacle its whole length; pod linear-oblong, raised on a long stipe, which rises from the top of the receptacle.

ISOME′RIS. Sepals 4, united below, somewhat spreading, marescent; petals 4, oblong, sessile, regular; receptacle fleshy, sub-hemispherical, produced into a small dilated appendage on the upper side; stamens equal, much exserted; capsule large, obovate, elliptical, coriaceous, indehiscent, stipitate, crowned with the very short subulate style; seeds several, very large, smooth.

LEON″TICE. Calyx of 6 sepals, caducous; petals 6, having a scale at the base; nectaries 5, inserted upon the claws of petals; anthers adnate to the filaments, 2-celled. (pappoose root.)

PRI′NOS. Calyx minute, 6-cleft; corolla sub-rotate, monopetalous, 6-parted; berry 6-seeded. (winter-berry.)

FLŒR″KIA. Calyx 3-leaved; petals 3 shorter than the sepals; seeds 2 or 3, superior.

TILLAND″SIA. Calyx 3-cleft, sub-convolute, permanent; corolla 3-cleft, bell-form, somewhat tubular; capsule 1 to 3-celled; seed comose.

DIPHYL″LIA. Sepals 3, caducous; petals 6, opposite the divisions of the calyx; anthers adhering to the filaments; berry 1-celled; seeds 2 or 3, roundish.

B. *Flowers issuing from a spatha.*

AMARYL″LIS. Corolla superior, 6-petalled, unequal; filaments unequal, declined, inserted in the throat of the tube. (atamask lily.) *S.*

AL″LIUM. Spatha many-flowered; corolla inferior, 6-parted, very deeply divided; divisions ovate, spreading; capsule 3-celled, 3-valved, many-seeded; flowers in close umbels or heads. (leek, garlic, onion, cives.)

HYPOX″IS. Glume-like spatha 2-valved; corolla superior, 6-parted, permanent; capsule elongated, narrow at the base, 3-celled, many-seeded; seed roundish. (star-grass.)

PONTEDE′RIA. Corolla inferior, 6-cleft, 2-lipped, with 3 longitudinal perforations below; capsule with utricles, fleshy, 3-celled, many-seeded; 3 stamens, commonly inserted on the tip, and 3 on the tube of the corolla. (pickerel weed.)

PANCRA′TIUM. Flower funnel-shaped, with a long tube; nectary 12-cleft, bearing the stamens. *S.*

BRODIÆ′A. Corolla inferior, bell-form, 6-parted; filaments inserted in the throat of the corolla; germ pedicelled; capsule 3-celled, many-seeded. *S.*

CRI′NUM. Corolla superior, funnel-form, half 6-cleft, tube filiform; border spreading, recurved; segments subulate, channelled; filaments inserted on the throat of the corolla, separate. *S.*

GALAN″THUS. Petals 3, concave, superior; nectaries (or inner petals) 3, small, emarginate; stigma simple. (snowdrop.) Ex.

NARCIS″SUS. Corolla bell-form, 1-leafed, spreading, 6-parted, or 6-petalled, equal, superior; nectary bell-form, 1-leafed, enclosing the stamens. (jonquil, daffodil.) Ex.

C. *Flowers with a single, corolla-like, perianth.*

ALE′TRIS. Corolla tubular-ovate, 6-cleft, wrinkled; stamens inserted upon the orifice; style 3-sided, 3-parted; calyx half superior, 3-celled, many-seeded. (false aloe.)

LOPHIO′LA. Corolla 6-cleft, persistent, woolly, bearded inside; anthers erect; filaments naked; stigma simple; capsule opening at the summit.

AGA′VE. Corolla superior, tubular, funnel-form, 6-parted; stamens longer than the corolla, erect; capsule triangular many-seeded.

PHALAN″GIUM. Corolla inferior, 6-petalled, spreading; filaments smooth; capsule ovate; seeds angular.

NARTHE′CIUM. Corolla 6-parted, colored; filaments hairy; capsule prismatic, 3-celled; seed appendaged at each end. (false asphodel.)

STREPTO′PUS. Corolla 6-cleft, cylindrical, segments with a nectariferous pore at the base; anthers longer than the filaments; stigma very short; berry sub-globose, smooth, 3-celled; seeds few.

HEMEROCAL″LIS. Corolla 6-parted, tubular, funnel-form; stamens declined; stigma small, simple, somewhat villose. (day-lily.) Ex.

ORNITHOG″ALUM. Corolla 6-petalled, inferior, erect, permanent, spreading above the middle; filaments dilated, or subulate at the base; capsule roundish, angled, 3-celled; seed roundish, naked. (star of Bethlehem.)

LIL″IUM. Corolla liliaceous, inferior, 6-petalled; petals with a longitudinal line from the middle to the base; stamens shorter than the style; stigma undivided; capsule sub-triangular, with the valves connected by hairs crossing as in a sieve. (lily.)

CLINTO′NIA. Perianth 6-parted, campanulate; stamens 6, inserted at the base; style compressed; stigma 2-lobed, compressed; berry 2-celled cells many-seeded

ERYTHRO′NIUM. Corolla liliaceous, inferior, 6-petalled; petals reflexed, having 2 pores and 2 tubercle-form nectaries at the base of the 3 inner, alternate petals capsule somewhat stiped: seeds ovate. (dog-tooth violet, or adder-tongue.)

UVULA′RIA. Corolla inferior, 6-petalled, with a nectariferous hollow at the base of each petal; filaments very short, growing to the anthers; stigmas reflex; capsule 3-cornered, 3-celled, 3-valved, with transverse partitions; seeds many, sub-globose, arilled at the hilum. (bell-wort.)

CONVALLA′RIA. [SMILACI′NA, POLYGONA′TUM, DRACÆ′NA.] Corolla inferior, 6-cleft; berry globose, 3-celled, spotted before ripening. (Solomon's seal.)

ASPAR″AGUS. Corolla inferior, 6-parted, erect, the three inner divisions reflexed at the apex; style very short; stigmas 3; berry 3-celled, cells 2-seeded. (asparagus.)

POLYAN″THES. Corolla funnel-form, incurved; filaments inserted in the throat; stigma 3-cleft; germ within the bottom of the corolla. (tuberose.) Ex.

HYACIN″THUS. Corolla roundish or bell-form, equal, 6-cleft; 3 nectariferous pores at the top of the germ; stamens inserted in the middle of the corolla; cells somewhat 2-seeded. (hyacinth.) Ex.

TU′LIPA. Corolla 6-petalled, liliaceous; style 0; stigma thick; capsule oblong, 3-sided. (tulip.) Ex.

ASPHODE′LUS. Corolla 6-parted, spreading; nectary covering the germ with 5-valves. (king's-spear, or asphodel.) Ex.

YUC″CA. Corolla inferior, bell-form; style 0; capsule oblong, 3-celled, opening at the summit; seeds flat. (Adam's needle.) *S.*

FRITILLA′RIA. Corolla inferior, 6-petalled, bell-form, with a nectariferous cavity above the claw of each; stamens of the length of the corolla; seeds flat. (crown imperial.) *S.*

SCIL′LA. Corolla 6-petalled, spreading, caducous; filament thread-form, attached to the base of the petals. (squills.) *S.*

C. *Flowers with a single, calyx-like perianth, without a spatha.*

A′CORUS. Receptacle spadix-like, cylindric, covered with florets; calyx 6-parted, naked; corolla 0 (or calyx 0, corolla 6-parted or 6-petalled); style 0; stigma small; capsule 3-celled, 3-seeded. (sweet-flag.)

JUN″CUS. Glume or outer calyx 2-valved; perianth inferior, 6-leaved, glume-like, permanent; stigmas 3; capsule 1 or 2-celled, 3-valved, many-seeded; seeds attached to a partition in the middle of each valve. (rush-grass bulrush.)

ORON″TIUM. Spadix cylindrical, crowded with flowers; perianth 6-petalled, naked; stigma 0; capsule bladder-like, 1-seeded. (flowering arum.)

LUZU′LA. Perianth 6-parted, glumaceous; capsule superior, 3-celled, 3-valved; cells 1-seeded. (false rush-grass.)

ORDER II. DIGYNIA.

ORY′ZA. Calyx-glume 2-valved, 1-flowered; corolla 2-valved, adhering to the seed. (rice.) Ex.

OXY′RIA. Perianth simple, 4-sepalled, 2 inner ones largest; corolla none; nut 3-sided, with a broad membranaceous margin; stamens 2 to 6; stigma large, plumose.

NEC″TRIS. Calyx inferior, 6-sepalled; corolla none; carpels 3, not opening. Calyx considered as 6-parted, 3 inner divisions petal-like, obtuse, and smaller; capsule bladder-like, 1 or 2-celled, 1 or 2-seeded.

ORDER III. TRIGYNIA.

VERA′TRUM. Polygamous; calyx 0; corolla 6-parted, expanding; segments sessile without glands; stamens inserted upon the receptacle; capsules 3, united, many-seeded.

TRIL″LIUM. Calyx 3-leaved, inferior, spreading; corolla 3-petalled; styles 0; stigmas 3; berry 3-celled, many-seeded. (false wake-robin.)

RU′MEX. Calyx 3-leaved; petals 3, valve-like, converging (or calyx 6-sepalled, and corolla 0); stigmas many-cleft; seed 1, naked, 3-sided. (dock, field-sorrel.)

MELAN″THIUM. Polygamous; perianth rotate, 6-parted; segments with 2 glands at the base of each; claws staminiferous; capsule sub-ovate, 3-celled; apex 3-cleft; seeds many, membranaceous, winged. (black-flower.)

ZIGADE′NUS. Perianth 6-leaved, colored, spreading, with 2 glands above the narrow base of each leaf; stamens inserted in contact with the germ; capsule 3-celled, many seeded.

HELO′NIAS. Perianth 6-parted, spreading, without glands; styles 3, distinct; capsule 3-celled, 3-horned; cells few-seeded.

XEROPHYL″LUM. Perianth sub-rotate, deeply 6-parted; stigmas 3, revolute; capsule sub-globose, 3-celled; cells 2-seeded, opening at the top.

TOFIEL″DIA. Perianth 6-parted, with a small 3-parted involucre; capsule 3 to 6-celled; cells many-seeded.

SCHEUCHZE′RIA. Perianth 6-parted; anthers linear; stigmas sessile, lateral; capsule inflated, 2-valved, 1 to 2-seeded.

TRIGLO′CHIN. Perianth of 6 deciduous leaves, 3 inserted above the rest; stamens very short; capsules 3 to 6, united by a longitudinal receptacle. (arrow-grass.)

MEDEO′LA. GYRO′MEA. Perianth 6-parted, revolute; stigmas 3-divaricate, united at the base; berry 3-celled; cells 3 to 6-seeded. (Indian cucumber.)

SA′BAL. Flowers perfect, spathas partial; filaments free, thickened at the base 1 to 3-seeded, seeds bony. (false fan-palm.) *S.*

CHAMÆ′ROPS. Flowers polygamous; spatha compressed; spadix branched; perianth 3-parted; corolla 3-petalled; filaments partly united; drupe 3-celled, 2 of them often empty. The staminate flowers grow on distinct plants. (fan-palm.) *S.*

CAL″OCHOR″TUS. Corolla 6-parted, spreading, 3 inner segments larger, with the upper side woolly; filaments short, inserted on the base of the petals; anthers arrow-form; stigmas reflexed; capsule 3-celled. *S.*

NOLI′NA. Corolla 6-parted, spreading segments nearly equal; styles short; stigmas recurved; capsule 3-sided, 3-celled; seed 1, convex. *S.*

ORDER XIII. POLYGYNIA.

Alis″ma. Calyx 3-leaved; petals 3; capsules numerous, 1-seeded, not opening.

CLASS VII. HEPTANDRIA.

ORDER I. MONOGYNIA.

Trienta′lis. Calyx 7-leaved; corolla 7-parted, equal, flat; berry juiceless, 1-celled, many-seeded; number of stamens variable. (chick-wintergreen.)

Æ′sculus. Calyx inflated, 4 or 5-toothed; corolla 4 or 5-petalled, inserted on the calyx, unequal, pubescent; capsule 3-celled; seeds large, solitary, chestnut-form. (horse-chestnut.) *S.*

ORDER III. TRIGYNIA.

Franke′nia. Sepals 5, united in a furrowed tube, persistent, equal; petals 5, unguiculate, with appendages at the base of the limb; capsule 1-celled, many-seeded. *S.*

ORDER IV. TETRAGYNIA.

Sauru′rus. Calyx in an ament or spike, with 1-flowered scales; corolla 0; anthers adnate to the filaments; germs 4; berries or capsules 4, 1-seeded; stamens 6, 7, 8, or more. (lizard-tail.)

CLASS VIII. OCTANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers superior.*

Rhex″ia. Calyx ventricose-ovate at the base, limb 4-cleft; petals 4, ovate; capsule included in the calyx, 4-celled; seeds numerous, cochleate. (deer-grass.)

Gau′ra. Calyx 4-cleft, tubular; corolla 4-petalled, ascending toward the upper side; nut 4-cornered, seeded. (Virginian loose-strife.)

Œno′thera. Calyx 4-cleft, tubular, caducous, divisions deflected; petals 4, inserted on the calyx; stigma 4-cleft; capsule 4-celled, 4-valved; seeds not feathered, affixed to a central 4-sided columella. (scabish, or evening-primrose.)

Epilo′bium. Calyx 4-cleft, tubular; corolla 1-petalled; capsule oblong and of great length; seeds feathered. (willow-herb.)

Oxycoc″cus. Calyx superior, 4-toothed; corolla 4-parted, the divisions sub-linear, revolute; filaments converging; anthers tubular, 2-parted, berry many-seeded. (cranberry.)

Fu′schsia. Calyx funnel-form, colored, superior, caducous; petals (or nectaries) 4, sitting in the throat of the calyx, alternating with its divisions; stigma 4-sided, capitate; berry oblong, 4-celled; seeds numerous. (ear-drop.)

Clark″ia. Calyx 4-cleft, tubular; corolla 4-petalled, 3-lobed, cruciform; petals with claws; stamens 4; stigma petal-like, 4-lobed; capsule 4-celled. (beautiful clarkia, false tree-primrose.) *S.*

B. *Flowers inferior.*

Menzie′sia. Calyx deeply 5-cleft; corolla 1-petalled, ovate, 4 to 5-cleft; stamens inserted into the receptacle; capsule 4-celled; seeds numerous, oblong.

Dir″ca. Perianth colored, campanulate, border obsolete; stamens unequal, exserted, berry 1-seeded. (leather-wood.)

Jefferso′nia. Calyx 4-sepalled; petals 8; capsule obovate, opening below the top. (twin-leaf.)

Dodo′næa. Sepals 4, deciduous; petals 0; style 1, filiform.

A′cer. Polygamous (sometimes hexandrous); calyx 5-cleft; corolla 4 or 5-petalled, or wanting; samaras 2, united at the base, 1-seeded, often 1 rudiment of a seed. (maple.)

Eri′ca. Calyx 4 leaved, permanent, corolla 4-cleft, permanent; filaments inserted on the receptacle; anthers bifid; capsules membranaceous, 4 to 8-celled, the partitions form the margins of the valves; seeds many in each cell. (heath.) Ex.

Daph″ne. Calyx 0; corolla 4-cleft, withering, including the stamens; drupe 1-seeded. (mezereon.) Ex.

Tropæo′lum. Calyx 4 or 5-cleft, colored spurred; petals 4 or 5, unequal; nuts leathery, sulcate. (nasturtion.) Ex.

Elliot″tia. Calyx 4-toothed, inferior corolla deeply 4-parted; stigma capitate (false-spiked alder.) *S.*

Amy′ris. Flowers perfect; calyx 4-toothed; petals wedge-form, longer than the stamens; germ 1-celled; stigma sessile.

ORDER II. DIGYNIA.

Chrysosple′nium. Calyx superior, 4 or 5-cleft, colored; corolla 0; capsule 2-beaked, 1-celled, many-seeded. (golden saxifrage, water-carpet.)

ORDER III. TRIGYNIA.

Pol″ygo′num. Calyx inferior, 5-parted, colored; corolla 0; seed 1, angular, covered with the calyx; stamens and pistils vary in number. The calyx in some species might be taken for a corolla. (knot-grass, water-pepper, buck-wheat, heart's-ease.)

Brunich″ia. Calyx tubular, inflated, 5 cleft, angular at the base; corolla 0; styles short; stigma 2-cleft; seed 1; stamens 8 to 10.

Sapin″dus. Calyx of 4 sepals; corolla of 4 petals; capsule fleshy, ventricose. (soap-berry.)

Cardiosper″mum. Calyx 4-sepalled; petals 4; nectary 4-leaved, unequal; capsule membranaceous, inflated, 3-lobed, 3-celled; seeds round, marked at the hilum with a heart-formed spot. (heart-seed.) *S.*

ORDER IV. TETRAGYNIA.

Adox″a. Calyx inferior, 2 or 3-cleft; corolla 4 or 5-cleft; berry 1-celled, 4 or 5-seeded, attached to the calyx; flowers lateral stamens 8 to 10. *S.*

Bryophyl″lum. Sepals 4; petals 4, connate into a cylinder; seeds many.

CLASS IX. ENNEANDRIA.

ORDER I. MONOGYNIA.

Lau′rus. Calyx 4 to 6-parted; corolla 0 nectaries 3, each a 2-bristled or 2-lobed gland surrounding the germ; drupe 1-seeded; stamens vary from 3 to 14, but they are gener ally in two series of 6 each, with 3 of the inner series barren, often diœcious. The calyx may be taken for a corolla. (sassafras, spice-bush.)

ORDER II. DIGYNIA.

Erigo′num. Perianth bell-form, 5-cleft; seed triangular, covered by the calyx; flowers involucred. *S.*

Plee′a. Calyx none; corolla 6-parted, spreading; segments linear, acute; capsule roundish, 3-angled, 3-celled, partitions obsolete; seeds numerous, minute, sub-terete and caudate, attached to the margin of the valves.

ORDER III. TRIGYNIA.

Rhe′um. Perianth 6-cleft, permanent; seed 1 to 3-sided. (rhubarb.)

CLASS X. DECANDRIA.

ORDER I. MONOGYNIA.

A. *Flowers polypetalous, irregular* (*mostly papilionaceous*)

Cas″sia. Calyx 5-leaved; corolla 5-petalled; anthers 3, lower ones beaked, and on longer incurved filaments; legume membranaceous. (cassia.)

Bapti′sia. Calyx 4 or 5-cleft, half-way (sometimes 4-toothed), somewhat 2-lipped; corolla papilionaceous; wings of the length of the reflexed banner; stamens caducous; legume inflated, smooth, many-seeded. (wild indigo.)

Cer″cis. Calyx 5-toothed, gibbous below; corolla papilionaceous, wings longer than the banner; keel 2-petalled; legume compressed; seed-bearing suture margined; seeds obovate. (Judas-tree.)

Sopho′ra. Calyx 5-toothed; pod many-seeded, not winged. *S.*

Ther″mia. Calyx oblong, 2-lipped, convex behind; banner reflexed; keel obtuse; pod linear, many-seeded. (false lupine.) *S.*

Virgil″ia. Calyx 5-cleft; petals equal; stigma beardless; pod compressed, oblong, many-seeded. *S.*

Poma′ria. Calyx turbinate, 5-parted, caducous; petals 5, with short claws; filaments hirsute below; legume 1-celled, 2-seeded. *S.*

Rhodo′ra. Calyx 5-toothed; corolla 3-petalled, or 2-petalled, with the upper one deeply parted; stamens declined; capsule 5-celled, 5-valved, opening at the top.

B. *Flowers polypetalous, regular.*

Pyro′la. Calyx 5-parted; petals 5; styles longer than the stamens; anthers with 2 pores at the base before, and at the top after the opening of the flower; capsule 5-celled, dehiscent at the angles near the base. (shin-leaf.)

Chimaph″ila. Calyx 5-parted; petals 5; anthers beaked, with 2 pores at the base before, and at the top after the opening of the flower; style immersed; stigma thick, orbiculate; capsule 5-celled, dehiscent at the angles near the summit. (prince's pine, pipsissiwa.)

Leiophyl″lum. Calyx 5-parted; corolla flat, 5-parted or 5-petalled; stamens longer than the corolla, with lateral anthers opening longitudinally on their insides; capsule 5-celled, dehiscent at the top, 5-valved; valves ovate with margins inflexed, remote, straight, columella sub-ovate, terete, rugose; seeds small, not winged; leaves always glabrous. (sleek-leaf.)

Cle′thra. Calyx 5-parted, permanent; corolla 5-petalled; style permanent; stigma short, 3-cleft; capsule 3-celled, 3-valved, enclosed by the calyx. Spiked. (sweet pepper-bush.)

Ru′ta. Calyx 5-parted; petals concave, receptacle surrounded by 10 nectariferous dots; capsule lobed; petals sometimes 4, and stamens 8. (rue.) Ex.

Le′dum. Calyx minute, 5-toothed; corolla 5-petalled, spreading; stamens exserted, anthers opening by 2 terminal pores; capsule sub ovate, 5-celled, 5-valved, opening at the base. (Labrador tea.)

Myloca′rium. Calyx 5-toothed; petals 5; stigma sessile; capsule superior, winged 3-celled, 1-seeded, seed subulate. (buckwheat-tree.) *S.*

Me′lia. Calyx minute, 5-parted; petals 5; nectary 10-toothed, cylindric; drupe 5-celled, 5-seeded. (pride of China.) *S.*

Jussi′æu. Calyx 4 or 5-parted, superior, persistent; petals 4 or 5, ovate; capsule many-seeded, seeds minute. *S.*

Swiete′nia. Calyx 5-cleft; petals 5; capsule 5-celled, opening at the base, woody; seeds winged. (mahogany-tree.) *S.*

Trib″ulus. Calyx 5-parted; petals 5, spreading; styles none; stigma partly 5-cleft; capsules generally 5, gibbous, sub-spinose 2 or 3-seeded. (caltrops.) *S.*

Proso′pis. Calyx hemispherical, 4-toothed, petals 5, lance-linear, recurved at the apex; filaments capillary, adnate at the base; stigma simple; legume long, many-seeded. *S.*

Limnan″thes. Sepals 5, united at the base; petals 5, cuneiform, retuse, longer than the sepals; ovaries 5; styles united into one, nearly to the top. *S.*

Limo′nia. Calyx 4 or 5-cleft, urceolate, marescent; petals 4 or 5; stamens 8 to 10, filaments distinct, subulate; anthers cordate, oblong; receptacle elevated, forming a short stipe to the ovary; style 1; stigma somewhat lobed; fruit orange-form, 4 or 5-celled, or, by abortive growth, fewer; seeds solitary in each cell.

Dionæ′a. Calyx 5-parted or 5-leaved petals 5; stigma fringed; capsule roundish, gibbous, 1-celled, many-seeded; petals sometimes 6. (Venus' fly-trap.) *S.*

C. *Flowers monopetalous.*

Arbu′tus. Calyx inferior, 5-parted, minute; corolla ovate, pellucid at the base; border small, 5-cleft, revolute; filaments hairy; berry 5-celled. (bear-berry.)

Epigæ′a. Calyx double, outer 3-leaved, inner 5-parted (or calyx 5-parted, with 3 bracts); corolla salver-form; border 5-parted, spreading; tube villose within; capsule 5-celled, many-seeded; receptacle 5-parted (trailing arbutus.)

Gaulthe′ria. Calyx inferior, double, outer 2-leaved, inner 5-cleft (or calyx 5-cleft, with 2 bracts); corolla ovate; border small, 5-cleft, revolute; filaments hairy; receptacle 10-toothed (or with a 10-pointed nectary); capsule 5-celled, invested with the berry-like calyx. (spicy wintergreen.)

Vaccin″ium. Calyx superior, 5-toothed or 5-parted; corolla bell or pitcher-form, 5-cleft, the divisions reflexed; filaments inserted on the germ with the corolla; berry 4 or 5-celled, many-seeded. The foreign species are sometimes octandrous. (whortleberry.)

Androm″eda. [**Lyonia.**] Calyx 5-parted or 5-toothed, inferior; corolla ovate, roundish or sub-cylindric, with a 5-cleft, reflexed mouth; capsule 5-celled, 5-valved, with partitions contrary; stamens sometimes 8. (white-bush, leather-leaf.)

Kal″mia. Calyx 5-parted; corolla wheel-salver-form, with 10 horns beneath and 10 cavities within, containing the anthers until the pollen is mature; capsule 5-celled, many-seeded. (laurel.)

Rhododen″dron. Calyx 5-parted; corolla 5-cleft, somewhat funnel-form and oblique; stamens declining, varying from 5 to 10; anthers opening by 2 terminal pores; capsules 5-celled, 5-valved, opening at the top. (rose-bay.)

D. *Flowers without a calyx* (*or with a colored petal-like one*)*; whole plant destitute of green herbage.*

Monotro′pa. Corolla confusedly polypetalous, permanent; petals about 5, with nectariferous hollows at their bases; anthers reniform, sub-peltate, 1-celled, giving out pollen by 2 holes near the middle; stigma orbicular, not bearded; capsule 5-celled, 5-valved. (bird's-nest.)

Pterospo′ra. Corolla 5-parted; nectary ovate, with a 5-toothed, reflexed margin, enclosing the stamens; anthers 2-celled, 2-bristled, sub-peltate; filaments flat; style short; stigma capitate; capsule sub-globose, 5-celled. The nectary is considered as a corolla, and the corolla as a calyx, by some. "But the three genera in this section," says Eaton, "should be united in one, by altering two or three words in the definition." (Albany beech-drops.)

Monotrop″sis. Corolla 5-petalled, withering; ovate, acuminate, close pressed to the nectary; nectary bell-form, fleshy; anthers clavate.

ORDER II. DIGYNIA.

Hydran″gea. Calyx 5-toothed, superior; corolla 5-petalled; capsule 2-celled, 2-beaked, dehiscent between the beaks. (hydrangea.) See Hortensia.

Saxifra′ga. Calyx 5-parted, half superior; corolla 5-petalled; capsule 2-celled, 2-beaked, opening between the beaks, many-seeded. (saxifrage.)

Mitel″la. Calyx 5-cleft, permanent; petals 5, pinnatifid, inserted into the calyx; capsule 2-celled, 2-valved, valves equal.

Sapona′ria. Calyx inferior, 1-leafed, tubular, 5-toothed, without scales; petals 5, with claws; capsule oblong, 1-celled. (soapwort.)

Dian″thus. Calyx inferior, cylindrical, 1-leafed, with 4 or 8 scales at the base; petals 5, with claws; capsule cylindrical, 1-celled, dehiscent at the top. (pink, sweet-william.)

Tiarel″la. Calyx 5-parted, persistent; petals 5, inserted into the calyx, unguiculate, entire; capsule 1-celled, 2-valved.

Scleran″thus. Calyx 5-cleft, with the stamens inserted upon it; corolla 0; capsule 1-celled, covered with the calyx.

ORDER III. TRIGYNIA.

Sile′ne. Calyx 1-leaved, tubular or conic, 5-toothed; petals 5, with claws, generally crowned at the orifice; capsule 3-celled, 6-toothed, many-seeded.

Arena′ria. Calyx inferior, spreading, 5-leaved; petals 5, entire; capsule 1-celled, many-seeded. (sandwort.)

Cucu′bulus. Calyx 1-leaved, inflated, 5-toothed; petals 5, unguiculate; capsule 3-celled. (bladder-campion.)

Stella′ria. Calyx 5-sepalled; petals 5, deeply cleft; capsule 1-celled, opening with 6 teeth, many-seeded. (starwort.)

Horten″sia. Calyx 5-toothed, minute, corolla 5-petalled; the flowers composing the cyme have a large, colored, permanent petal-like 5-leaved calyx, and a minute, caducous, 4 or 5-petalled corolla; stamens 8, 10, or 11. (changeable hydrangea.) Ex. This plant is much altered by cultivation

ORDER IV. TETRAGYNIA.

Micrope′talon. [**Spergulas″trum.**] Sepals 5, expanding; petals 5, minute, entire, often wanting; stigmas 4, sessile; capsule ovate, longer than the calyx, 4-valved. (blind-starwort.)

ORDER V. PENTAGYNIA.

Sper″gula. Calyx 5-leaved; petals 5, undivided; capsule ovate, 5-celled, 5-valved.

Ceras″tium. Calyx 5-leaved; petals 5, 2-cleft or emarginate; capsule 1-celled, dehiscent at top, 10-toothed. (mouse-ear, chickweed.)

Agrostem″ma. Calyx 5-cleft, prismatic or tubular, coriaceous; petals 5, with claws border obtuse, entire; capsule 1-celled, many-seeded, opening with 5 teeth. (cockle.)

Oxa′lis. Calyx permanent, 5-parted or 5-leaved, inferior; petals 5, cohering by the claws; capsule 5-celled, 5-cornered, dehiscent at the corners; seeds 2 or more in a cell, covered with an elastic aril; stamens with 5 shorter outer ones adhering at their bases.

Pentho′rum. Calyx 5 to 10-cleft; petals 5 or 0; capsules 5-pointed, 5-celled; cells divided transversely, many-seeded. (Virginian orpine.)

Se′dum. Calyx inferior, 5-cleft; 5 petals; 5 nectariferous scales at the base of the germ; capsules 5. (live-forever, orpine stone-crop.

Lych″nis. Calyx 1-leaved, oblong, 5 toothed; petals 5, with claws; the limb somewhat 2-cleft; capsule 1 or 5-celled, with a 5-toothed opening. (campion.) Ex.

ORDER X. DECAGYNIA.

PHYTOLAC″CA Calyx 0; corolla 5-petalled or 5-cleft, calyx-like, inferior; berry 10-celled, 10-seeded. (poke-weed.)

CLASS XI. ICOSANDRIA.

ORDER I MONOGYNIA.

CAC″TUS. Calyx superior, many-cleft, imbricate; petals numerous, in many series the inner ones larger; stigma many-cleft berry 1-celled, many-seeded, umbilicate (prickly-pear.)

BARTO′NIA. Calyx superior, 5-cleft; corolla 10-petalled, inserted on the calyx; capsule cylindrical, oblong, 1-celled, summit flat, valvular, the valves 3 to 7; receptacle thick; seeds numerous, compressed, arranged horizontally in a double series.

CUPHE′A. Calyx inflated, tubular, 6 to 12-toothed, unequal. (wax-bush.)

DECO′DON. Calyx hemispheric, campanulate, 10-toothed, 5 teeth longer and spreading; petals 5, undulate; capsule covered with the calyx, 3-celled, 3-valved.

LYTH″RUM. Calyx cylindric, striate; 8 to 12-toothed; petals 4 to 6, equal, inserted on the calyx; stamens as many, or twice as many, as the petals, sometimes fewer; capsule 2-celled, many-seeded. (milk-willow herb.)

PRU′NUS. Calyx inferior, 5-toothed; corolla 5-petalled; drupe ovate or oblong, fleshy, very smooth, covered with grayish dust; putamen compressed, acute at both ends, subsulcate at the margin, elsewhere smooth. (plum.)

CER″ASUS. Drupe globose or umbilicate at base, fleshy, very smooth, destitute of gray powder; nucleus sub-globose, smooth. (cherry.)

MENTZE′LIA. Calyx 5-cleft, superior, caducous; petals 5; capsule 1-celled, 3-valved, cylindric, 3 to 6-seeded; leaves oblong, arranged longitudinally. *S.*

DECUMA′RIA. Calyx superior, 8 to 10-cleft; petals 8 to 10; capsule 7 to 9-celled, many-seeded, seeds subulate, minute. *S.*

CHRYSOBALA′NUS. Calyx inferior, 5-cleft; petals 5; style lateral; drupe prune-form; nut 5-grooved, 5-valved, 1-seeded. *S.*

TIGA′REA. Calyx inferior, 5-cleft; petals 5; capsule oblong, acuminate, pubescent, 1-seeded. *S.*

MYR″TUS. Calyx superior, 5-cleft; petals 5; berry 2 or 3-celled, many-seeded. (myrtle.) Ex.

AMYG″DALUS. Calyx 5-cleft, inferior; petals 5; drupe has a perforated putamen; flowers sessile (peach.) Ex.

PURSH″IA. Calyx tubular, cleft into 5 ovate, obtuse lobes; petals 5-obovate, unguiculate, inserted in the mouth of the calyx, with 25 stamens; germ oblong, full stiped, glandular-pubescent, tapering into a subulate style; stigma pubescent, lateral, almost as long as the style. *S.*

ARMENIA′CA. Flowers sessile, calyx 5-cleft, inferior; petals 5; drupe fleshy, pubescent; putamen with one margin acute and the other obtuse, furrowed both sides (apricot.) Ex.

PU′NICA. Calyx 5-cleft, superior; petals 5; pome or berry many-celled, many-seeded; receptacle parietal; seed berried. (pomegranate.) Ex.

PHILADEL″PHUS. Calyx 4-5-parted, superior, top-form; corolla 4 or 5-petalled, style 4-cleft; capsule 4-5-celled, many-seeded; seeds arilled. (false syringa, or mock-orange.) Ex.

ORDER II. DIGYNIA, TO ORDER V. PENTAGYNIA, OR DI-PENTAGYNIA.

AGRIMO′NIA. Calyx inferior, 5-cleft or 5-toothed, invested with an outer lobed one petals 5; stamens 12; seeds 2, in the bottom of the calyx. (agrimony.)

CRATÆ′GUS. Calyx superior, 5-cleft; petals 5; styles 1 to 5; berry mealy; seeds 2 to 5, bony. (thorn-bush.)

ARO′NIA. Calyx superior, 5-toothed; petals 5; fruit pomaceous; berry 5 or 10-celled; cells 1 or 2-seeded; seeds cartilaginous (shad-flower, choke-berry.)

PY′RUS. Calyx 5-cleft, superior; corolla 5-petalled; pome 5-celled, many-seeded; seed compressed, ovate. (pear, apple, quince.)

SPIRÆ′A. Calyx 5-cleft, inferior, spreading; corolla 5-petalled; petals equal, roundish; stamens numerous, exsert; capsules 3 to 12, 2-valved within, each 1 to 3-seeded. (steeple-bush, hard-hack.)

SESU′VIUM. Calyx 5-parted, colored; petals 0; stigmas 3 to 5; capsule superior, 3 to 5-celled, opening circularly, many-seeded.

GILLE′NIA. Calyx tubular, bell-form, contracted at the mouth, 5-cleft; petals 5, linear-lanceolate, somewhat unequal, coarctate at the claws; stamens 10 to 15 included; styles 5, contiguous; stigmas capitate, capsule 5-celled; cells 2-seeded. (Indian physic.)

SOR″BUS. Calyx 5-cleft; petals 5; styles 2 or 3; berry inferior, farinaceous, with 3 cartilaginous seeds. (mountain ash.)

FOTHERGIL″LA. Calyx inferior, truncate, obsoletely crenate; corolla 0; germ 2-cleft; styles 2; capsule 2-lobed, 2-celled; seeds brown, solitary.

MES″PILUS. Calyx superior, 5-cleft, divisions serrate; corolla 5-petalled; styles 2 to 5; drupe 2 to 5-seeded; seeds bony. Ex.

MESEMBRYAN″THEMUM. Calyx superior, 5-cleft; petals numerous, linear, cohering at the base; capsule fleshy, many-seeded, turbinate. (ice-plant.) Ex.

ORDER XII. POLYGYNIA.

RO′SA. Calyx urn-form, inferior, 5-cleft, fleshy, contracted toward the top; petals 5; seeds numerous, bristly, fixed to the sides of the calyx within. A genus remarkable for the multiplication of its petals by rich culture. (rose.)

RU′BUS. Calyx 5-cleft, inferior; corolla 5-petalled; pistils numerous; berry composed of many juicy 1-seeded acines on a dry receptacle. (raspberry, blackberry.)

DALIBAR″DA. Calyx 5 or 8-cleft, inferior; corolla 5-petalled; styles long, caducous, 5 to 8; berry composed of dry grains. (dry strawberry.)

GE′UM. Calyx inferior, 10-cleft, 5 alternate divisions smaller; corolla 5-petalled; seeds with a bent awn; receptacle columnar, villous. (avens, or herb-bennet.)

STYL″IPUS. Calyx inferior, 5-cleft, divisions equal; petals 5, oval, distant; stamens permanent, on a glandular ring; seeds compressed, ovate, glabrous, with scattering pubescence, sub-margined; receptacle columnar, villose. becoming elongated; awns geniculate.

POTENTIL″LA. Calyx flat, inferior, 10-cleft, 5 alternate divisions smaller; corolla 5-petalled; petals roundish or obovate; seeds awnless, roundish, rugose, fixed to a dry, small receptacle. (five-finger, cinquefoil.)

SIEVER″SIA. Calyx with a concave tube, and 5-cleft limb, and 5 bracts outside; petals 5; carpels numerous, caudate; style persistent; seeds ascending.

FRAGA′RIA. Calyx inferior, 10-cleft, 5 alternate divisions smaller; corolla 5-petalled; receptacle ovate, berry-like; acines naked, immersed in the receptacle, caducous. (strawberry.)

DRY′AS. Calyx 8 to 9-parted, tube concave; petals 8 to 9; carpels many, crowned by a terminal style.

CALYCAN″THUS. Lobes of the calyx in many rows, imbricate, lanceolate, colored; corolla 0; stamens unequal; acines many. *S.*

CLASS XII. POLYANDRIA.

ORDER I. MONOGYNIA.

TIL″IA. Calyx 5 or 6-parted, inferior, caducous; corolla 5 or 6-petalled; capsule 5 or 6-celled, globular, coriaceous, dehiscent at the base, 1-seeded; 4 of the cells sometimes empty. (bass-wood.)

CORCHO′RUS. Sepals 4 or 5; petals 4 or 5, rather shorter than the sepals, inferior; style very short, deciduous; stigmas 2 to 5; capsule pod-like or roundish; seeds commonly numerous in each cell.

PORTULAC″CA. Calyx 2-cleft, inferior; corolla 5-petalled; capsule 1-celled, opening transversely; columella 5, filiform. (purslane.)

CHELIDO′NIUM. Calyx 2-leaved, caducous; corolla 4-petalled; silique-like, capsule 1-celled, 2-valved, linear; seeds crested, many. (celandine.)

POLANIS″IA. See Cleo′me.

CIS″TUS. [Helianthemum.] Sepals 5, 2 smaller; petals 5; capsule 1-celled, 3-valved; valves septiferous in the middle. (rock-rose, frost-weed.)

HUDSO′NIA. Calyx tubular, 5-parted, unequal, inferior, petals 5; capsule 1-celled, 2 valved, 1 to 2-seeded.

TALI′NUM. Calyx of 2 ovate sepals; petals 5; capsule 1-celled, 3-valved, many-seeded.

CALANDRIN″IA. Sepals 2, inferior, persistent, united at the base; petals 3 to 5 without claws; stamens 4 to 15; style short, stigmas 3, thickish, short; capsule 3-valved many-seeded; seeds turgid, smooth and shining.

MECONOP″SIS. Petals 4; stigma 4 to 6-rayed; capsule prickly, 4 to 6-valved.

ARGEMO′NE. Petals 4 to 6; stigma 4 to 7-lobed; capsule obovate, 1-celled, opening at the summit by valves. (prickly poppy.)

SANGUINA′RIA. Calyx caducous, 2-leaved; corolla about 8-petalled; stigma sessile twinned, 2-grooved; capsule pod-like, ovate 1-celled, 2-valved, acute at each end; valves caducous; columella 2, permanent. (blood-root.)

GLAU′CIUM. Calyx 2-sepalled, caducous; corolla 4-petalled; capsule 1-celled, linear; seeds many, punctate.

PODOPHYL″LUM. Calyx 3-leaved, minute; corolla about 9-petalled; stigma large, crenate, sessile; berry 1-celled, crowned with the stigma, large, many-seeded; columella 1-sided. (wild mandrake.)

ACTÆ′A. [Cimcifuga.] Calyx 4-leaved, deciduous; petals 4, often wanting; stigma sessile, capitate; berry superior, 1-celled, many-seeded; seeds hemispherical. (necklace-weed, baneberry.)

MACRO′TIS. Calyx about 4-leaved, becoming colored before expanding, caducous; corolla many minute petals, very caducous, or wanting; stigma simple, sessile, curving towards the gibbous side of the germ; capsule 2-valved, dehiscent at its straight suture. (cohosh, blacksnake-root, bug-bane.)

SARRACE′NIA. Calyx double, permanent, 3 or 5-leaved; corolla 5-petalled, caducous stigma peltate, permanent, very large, covering the stamens; capsule 5-celled, 5-valved, many-seeded. (side-saddle flower.)

NU′PHAR. Calyx 5 or 6-leaved; petals many, minute, inserted on the receptacle with the stamens, nectariferous; stigma with a broad disk, and radiate furrows, sessile; pericarp berry-like, many-celled, many-seeded. (water-lily, yellow pond-lily.)

NYMPHÆ′A. Calyx 4 to 7-leaved; corolla many-petalled, petals about equalling the length of the calyx leaves attached to the germs beneath the stamens; stigma with a broad disk, marked with radiated lines; pericarp berry-like, many-celled, many-seeded. (pond-lily.)

PAPA′VER. Calyx 2-leaved, caducous; corolla 4-petalled; stigma a broad disk, with radiating lines; capsule 1-celled, dehiscent by pores under the permanent stigma. (poppy.) Ex.

THE′A. Calyx 4 or 6-leaved; corolla 6 or 9-petalled; capsule 3-seeded. (tea.) Ex.

CIT″RUS. Calyx 5-cleft; petals 5, oblong; filaments dilated at the base, in several parcels; berry 9 or 18-celled; polyadelphous (orange, lemon.) Ex.

CHRY′SEIS. Receptacle dilated, salver-formed; limb expanding, entire; calyx mitre-form, deciduous; corolla 4-petalled, inserted by the claws in the throat of the receptacle, and bearing the stamens; capsules silique-form, 2-valved; seeds affixed the margins of the valves.

Beja ria. Bafa′ria. Calyx 7-cleft; petals 7; stamens 14; capsule 7-celled, many-seeded. *S.*

Lewis″ia Calyx from 7 to 9-sepalled; petals 14 to 18; stamens 14 to 18; style about 3-cleft; stigmas 2-cleft; capsules 3-celled, many-seeded; seeds shining. *S.*

ORDER II. DIGYNIA, INCLUDING ORDER V. PENTAGYNIA.

Delphin″ium. Calyx 0; corolla 5-petalled, unequal; nectary 2-cleft, horned behind; capsules 1 or 3, pod-like. (larkspur.)

Aconi′tum. Calyx 0; petals 5, upper one valved; nectaries 2, hooded, peduncled, recurved; capsule 3 or 5, pod-like. (monk's-hood.)

Aquile′gia. Calyx 0; petals 5, caducous; nectaries 5, alternating with the petals, and terminating downward in a spur-like nectary; capsules 5, erect; acuminated with the permanent styles, many-seeded. By some, the nectaries are considered as petals, and the corolla as a colored calyx. (columbine.)

Ascy′rum. Sepals 4, the 2 inner larger and cordate; petals 4; stamens scarcely united at the base. (St. Peter's wort.)

Calligo′num. Calyx 5-parted; corolla 0; filaments numerous, united at the base; germ superior, 4-sided, nut winged. *S.*

Rese′da. Perfect flower apetalous, surrounded by several fringed, petal-like, barren flowers; involucre spreading, many-leaved. (mignonette.) Ex.

Rhizopho′ra. Calyx 4-parted; corolla 4-parted; stigmas 2; seed 1, very long, base fleshy.

Hyper″icum. Calyx 5-parted; divisions equal, sub-ovate; corolla 5-petalled; filaments often united at the base in 3 or 5 sets; styles 2 to 5; capsules membranaceous, roundish, with a number of cells equal to the number of styles. The bases of the filaments are often in groups, when they are not united. (St. John's wort.)

Pæo′nia. Calyx 5-leaved; petals 5; styles 0; stigmas 2 or 3; capsules pod-like, many-seeded. Remarkable for the multiplication of petals by rich culture. (peony.) Ex.

Elo′dea. Sepals 5, equal, somewhat united at the base; petals 5, deciduous, equal; stamens 9 to 15, polyadelphous-parcels alternating with glands; styles 3, distinct; capsule oblong, membranaceous, 3-celled.

Nigel″la. Calyx 0; petals 5; nectaries 5, 3-cleft, within the corolla; capsules 5, convex. (lady-in-the-green, fennel flower.) Ex.

Dendrom″econ. Sepals 2; petals 4; stamens numerous; stigmas 2, sessile; capsule pod-shaped, furrowed; valves thick and coriaceous, almost woody, opening from the base to the apex; seeds rather large and numerous; pyriform, smooth. *S.*

ORDER XII. POLYGYNIA.

Asimi′na. Porcel″ia. Calyx 3-parted; petals 6, spreading, ovate, oblong, the inner smaller; anthers sub-sessile; berries several, ovate. (custard apple.)

Trol″lius. Sepals colored, 5 to 15, deciduous, petaloid; petals 5 to 20, small, capsules many, cylindrical, sessile, many-seeded. (globe-flower.)

Hydropel″tis. Sepals 3 to 4; petals 3 to 4; ovaries 6 to 18; seeds pendulous, ovate, globose. (water-shield.)

Hydras″tis. Calyx 3-leaved, petaloid, leafets ovate; petals 0; berry composed of many 1-seeded grains. (orange-root.)

Nelum″bium. Calyx petaloid, of 4 or 6 sepals; petals many, deeply immersed in the upper surface of a turbinate receptacle.

Illi′cium. Sepals 6; petals numerous, in 3 series; capsules many, disposed in a circle, 2-valved, 1-seeded. (anise-tree.) *S.*

Clema′tis. Petals 3, 4, 5, or 6; seeds compressed; styles permanent, becoming long, plumose tails. Some species are diœcious. (virgin's bower.)

Thalic″trum. Petals 4 or 5; filaments very long; seeds without tails, striate, terete. Some species are diœcious. (meadow-rue.)

Anem″one. Petals 5 to 9; seeds numerous, naked. (wind-flower, rue, anemone.)

Cop″tis. Petals 5 or 6, caducous; nectaries small, 5 or 6, cowled; capsules oblong, 5 to 8, stiped, stellate, beaked, many-seeded. (gold-thread.) By some the nectaries are mistaken for corollas, and the corollas for calyxes.

Cal″tha. Petals 5 to 9, orbicular; capsules numerous (5 to 10), many-seeded, compressed, 1-celled, spreading; nectaries 0; pistils variable in number. (American cowslip.)

Hellebo′rus. Petals 5 or more; nectary 2-lipped, tubular; capsules 5 or 6, many seeded, erectish, compressed. (hellebore.) Ex.

Magno′lia. Calyx 3-leaved; corolla 6 to 9-petalled; capsules numerous, imbricate on a strobile-like spike, 2-valved; seeds arilled, pendulous on long cords; berry-like. (magnolia, or beaver-tree.)

Lirioden″dron. Calyx 3-leaved; corolla 6 or 9-petalled, liliaceous; seeds in a sub-lanceolate samara, imbricate on a strobile-like spike. (tulip-tree, or white-wood.)

Hepat″ica. Calyx 3-leaved, a little distance below the corolla, entire; petals 6 to 9; seeds without tails. (liverleaf.)

Ranun″culus. Calyx 5-leaved; petals 5, with claws, and a nectariferous pore or scale on the inside of each; seeds without tails, naked, numerous. (crow-foot.) Some mistake an extra tegument for a capsule.

Sempervi′vum. Calyx 9 to 12-parted; petals 8 to 12; capsules 12, many-seeded; stamens 16 or 20. (house-leek.) Ex.

Platys″temon. Sepals 3, pilose; petals 6; stamens numerous; ovaries 10-14 distinct; stigmas sessile; carpels 10-14, linear, indehiscent articulated or transversely strangulated between each seed. *S.*

Ado′nis. Calyx 4 to 5-leaved; petals 5 or more, without nectariferous pores; seeds awnless. (pheasant's eye.) Ex.

ANNO′NA. Calyx 3-sepalled, thickened together at the base, concave, sub-cordate, acutish; petals 6, thickish, inner smaller or none; anthers sub-sessile, at the apex, angled, dilated, covering its receptacles; germs united into a sessile berry with the back muricate, scaly or reticulate, pulpy within, having 2 one-seeded cells. *S.*

CLASS XIII. DIDYNAMIA.

ORDRR I. GYMNOSPERMIA.

A. *Calyx 5-cleft, with the divisions or teeth nearly equal.*

TEU′CRIUM. Corolla deep cleft on the upper side and without an upper lip, lower lip 3-cleft, the middle division rounded; stamens and pistils incurved; stamens exsert through the cleavage on the upper side of the corolla. (wood-sage, wild germander.)

MEN″THA. Corolla nearly equal, 4-lobed; broadest division emarginate; stamens erect, distant. (spearmint, peppermint.)

ISAN″THUS. Calyx somewhat bell-form; corolla 5-parted; tube straight, narrow; divisions ovate, equal; stamens nearly equal; stigma linear, recurved. (blue gentian.)

HEDEO′MA. Calyx 2-lipped, gibbous at the base; upper lip with 3 lanceolate teeth; lower lip with 2 subulate ones; corolla ringent; 2 short stamens barren. (pennyroyal.)

CUNI′LA. Calyx cylindrical, 10-striate, 5-toothed; corolla ringent, with the upper lip erect, flat, and emarginate; 2 barren stamens, the 2 fertile ones with the style exserted; stigmas divided. (dittany.) On account of their barren stamens, this and the preceding genus have been classed under Diandria.

NEPE′TA. Calyx dry, striate; corolla with a longish tube; under lip with the middle division crenate; throat with a reflexed margin; stamens approximate. (catmint.)

LA′MIUM. Upper lip of the corolla vaulted, entire; lower lip 2-lobed, toothed on each side.

STA′CHYS. Calyx with its divisions awned; corolla with the upper lip vaulted, the lower lip 3-lobed; the middle division largest, emarginate; the lateral divisions reflexed; stamens reflexed towards the sides after discharging the pollen. (woundwort, hedge-nettle.)

LEONU′RUS. Calyx 5-angled, 5-toothed; corolla with the upper lip erect, villose, flat, entire; lower lip 3-parted; middle division undivided; lobes of the anthers parallel, having shining dots. (mother-wort.)

VERBE′NA. Calyx wifh one of the teeth truncate; corolla funnel-form, with a curved tube; border 5-cleft, nearly equal; seeds 2 or 4, with an extra vanishing tegument; sometimes 2 stamens are barren. (vervain.)

MARRU′BIUM. Calyx salver-form, rigid, marked with 10 lines; corolla with the upper lip cleft, linear, straight. (horehound.)

GLECHO′MA. Calyx 5-cleft; corolla double the length of the calyx; upper lip 2-cleft; lower lip 3-cleft, with middle segment emarginate; each pair of anthers approaching so as to exhibit the form of a cross (ground-ivy, gill-overground.)

PYCNAN″THEMUM. Involucrum bract-like, many-leaved, under small heads of flowers calyx tubular, striate; corolla with the upper lip sub-entire; lower lip 3-cleft; middle segment longer; stamens distant, nearly equal; cells of the anthers parallel. (mountain mint.)

AJU′GA. Upper lip of corolla very small, 2-toothed; stamens longer than the upper lip; anthers reniform. *S.*

BALLO′TA. Calyx 5-toothed, salver-form 10-striate; upper lip of the corolla crenate concave; seed ovate, 3-sided. (false mother-wort.) Ex.

HYSSO′PUS. Lower lip of the corolla 3-petalled; middle lobe sub-crenate; stamens straight and distant. (hyssop.)

GALEOP″SIS. Calyx 5-cleft, awned; upper lip of the corolla vaulted, sub-crenate; lower lip with 3 unequal lobes, having 2 teeth on its upper side. (flowering nettle.)

HYP″TIS. Calyx 5-toothed; corolla 2-lipped, the upper one 2-lobed, lower one 3-lobed, with the middle lobe calyx-like; stamens inserted in the large part of the tube and declined. *S.*

LEU′CAS. Calyx tubular, striate, 6 to 10-toothed; upper lip entire, lower lip long, 3-lobed; middle segment largest; anthers beardless, spreading; stigma 2-cleft, shorter than the upper lip. *S.*

SYNAN″DRA. Calyx 4-cleft; segments unequal subulate, inclined; upper lip of the corolla entire, vaulted lower lip with 3 unequal lobes; throat inflated, naked; filaments downy. *S.*

LAVANDU′LA. Calyx ovate, sub-dentate; bracted; corolla resupinate; stamens in the tube. (lavender.) Ex.

SATURE′JA. Calyx tubular, striate; corolla with divisions nearly equal; stamens distant. (savory.) Ex.

MOLUCCEL″LA. Calyx bell-form, much larger than the corolla, spinose. (shell flower.) Ex.

B. *Calyx 2-lipped.*

ORIGA′NUM. Calyxes collected into a 4 sided, strobile-like cone, with broad intervening bracts; corolla with the upper lip erect, flat, straight, emarginate, under lip 3-parted, divisions nearly equal. (marjoram.)

PRUNEL″LA. Calyx with the upper lip dilated; filaments 2-forked, with an anther on one of the points; stigma 2-cleft. (self-heal or heal-all.)

SCUTELLA′RIA. Calyx with an entire mouth, which is closed with a helmet-form lid after the corolla falls out; tube of the corolla bent. (scull-cap.)

TRI′CHOSTE′MA. Calyx resupinate; corolla with the upper lip falcate, the under lip 3-parted, with the middle division small, oblong; filaments very long, exsert, incurved or coiled. (blue-curls)

CLINIPO′DIUM. Involucre of many, linear

acuminate bracts; leafets placed under the whorls of flowers; upper lip of the corolla erect, emarginate, lower one the longest, emarginate. (field thyme.)

DRACOCEPH″ALUM. Calyx sub-equal, 5-cleft; orifice of the corolla inflated; upper lip concave, notched; stamens unconnected. (dragon-head.)

OCY′MUM. Calyx with the upper lip orbiculate, lower lip 4-cleft; corolla resupinate; one lip 4-cleft, the other undivided. A process at the base of the outer filaments. (sweet basil.) Ex.

THY′MUS. Calyx sub-campanulate, the throat closed with hairs; corolla with the upper lip flat, emarginate, lower lip longer. (thyme.) Ex.

MELIS″SA. Calyx dry, flattish above, with the upper lip sub-fastigiate; corolla with the upper lip somewhat vaulted, 3-cleft, lower lip with the middle lobe cordate. (balm.) Ex.

MACBRI′DEA. Calyx top form, 3-cleft, 2 segments large; corolla 2-lipped, the upper entire, the under 3-parted; anthers 2-lobed; the lobes spreading, fringed with small spines. *S.*

CALAMIN″THA. Calyx closed with hairs after flowering; throat of the corolla somewhat inflated, upper lip emarginate; lower one 3-parted. *S.*

CERAN″THERA. Calyx 2-lipped, the upper lip emarginate, the lower one 2-cleft; upper lip of the corolla 2-lobed, the lower one 3-parted, stamens exsert; anthers horizontal, awned at each end. *S.*

TUL″LIA. Calyx with the upper lip 3-toothed, lower one 2-toothed: teeth appendaged; corolla 2-lipped, with the upper lip very entire, lower one 3-parted, middle division largest. *S.*

ORDER II. ANGIOSPERMIA.

A. *Calyx* 2 *or* 3-*cleft.*

OBOLA′RIA. Calyx bract-like; corolla 4-cleft, bell-form; capsule 1-celled, 2-valved, many-seeded; stamens proceeding from the divisions of the corolla; stigma 2-cleft or emarginate. (penny-wort.)

CASTILLE′JA. Calyx spathe-form, upper lip 2-cleft, lower one wanting; corolla 2-lipped, lower one very short, 3-cleft, with 2-glands between the divisions; capsule 2-celled. *S.*

PHRY′MA. Calyx cylindric, upper lip longer, 3-cleft, lower lip 2-toothed; upper lip of the corolla emarginate, smaller; seed solitary. (lop-seed.)

B. *Calyx* 4 *or* 5-*cleft.*

EUCHRO′MA. Calyx inflated, 2 or 4-cleft; corolla 2-lipped, upper lip long, linear, embracing the style and stamens; anthers linear, with unequal lobes, cohering so as to form an oblong disk; capsule ovate, compressed, 2-celled; seeds numerous, surrounded with an inflated membrane.

BART″SIA. Calyx lobed, emarginate, colored; corolla less than calyx, upper lip longest, concave, entire, lower lip 3-cleft and reflexed; anthers with equal lobes, not cohering; capsule 2-celled, seeds angled. (painted cup.)

MELAMPY′RUM. Corolla with the upper lip compressed, the margin folded back, lower lip grooved, 3-cleft, sub-equal; capsule 2-celled, oblique, dehiscent on one side; seeds 2, cylindric, gibbous, cartilaginous, and smooth. (cow-wheat.)

SCHWAL″BEA. Calyx ventricose, tubular, upper segment shortest, lower large and emarginate; corolla ringent, upper lip entire, arched; capsule 2-celled, 2-valved; seeds imbricate, winged. (chaff-seed.)

RHINAN″THUS. Calyx inflated, 4-toothed, corolla ringent, upper lip compressed, lower lip flat, 3-lobed; capsule 2-celled, obtuse, compressed. (yellow-rattle.)

LANTA′NA. Flowers capitate; calyx 4-toothed; corolla unequally 4-parted; throat open; stamens within the tube; stigma hooked; drupes aggregated. *S.*

ORTHOCAR″PUS. Calyx tubular, 4-cleft, corolla 2-lipped, closed, upper lip smaller, compressed, margin inflexed, lower lip concave, 3-toothed; capsule 2-celled, 2 valved. *S.*

EUPHRA′SIA. Calyx cylindric, corolla 2-lipped, the upper lip 2-cleft, lower lip 3 lobed, with the divisions 2-cleft; lower anthers lobed, spinose. (eye-bright.) *S.*

C. *Calyx* 4 *or* 5-*cleft, or* 5-*toothed; plant without green herbage.*

OROBAN″CHE. Corolla ringent; capsule ovate, acute, 1-celled; seeds numerous; a gland beneath the base of the germ.

EPIPH″EGUS. Polygamous; calyx abbreviated, 5-toothed; corolla of the barren flowers ringent, compressed, 4-cleft, lower lip flat, of the fertile flowers minute, 4-toothed, caducous; capsule truncate, oblique, 1-celled, imperfectly 2-valved, opening on one side. (beech-drops, cancer-root.)

D. *Calyx* 5-*leaved, or* 5-*cleft; plant with green herbage.*

SCROPHULA′RIA. Corolla sub-globose resupinate, short bi-labiate, with an internal, intermediate scale; capsule 2-celled.

BIGNO′NIA. Calyx 5-toothed, cup-form, sub-coriaceous; corolla bell-form, 5-lobed, ventricose beneath; capsule silique-like, 2-celled; seed membrane winged. (trumpet-flower.)

BUCHNE′RA. Calyx 5-toothed; corolla with a slender tube, and the limb in 5 equal divisions, the lobes cordate; capsule 2-celled. (blue hearts.)

ANTIRRHI′NUM. Calyx 5-leaved or deeply 5-parted, the two lower divisions remote; corolla personate or ringent, spurred or with a prominent base; the throat closed with a prominent palate, capsule ovate, 2-valved, dehiscent at the apex, with reflexed teeth. (snap-dragon, toad flax.)

GERAR″DIA. Calyx 5-cleft or 5-toothed corolla sub-campanulate, unequally 5-lobed segments mostly rounded; capsule 2-celled dehiscent at the top. (false foxglove.)

PEDICULA′RIS. Calyx ventricose, 5-cleft

or obliquely truncate; corolla ringent, upper lip arched, emarginate and compressed; capsule 2-celled, mucronate, oblique; seeds numerous, angular, coated; leaves many cleft. (louse-wort, high heal-all.)

MIMU'LUS. Calyx prismatic, 5-toothed; corolla ringent, upper lip folded back upon its side, lower lip with a prominent palate; stigma thick, 2-cleft; capsule 2-celled, many-seeded; seeds minute. (monkey flower.)

CHELO'NE. Calyx 5-cleft or 5-leaved, 3-bracted; corolla ringent, inflated; the upper lip emarginate-obtuse, under lip slightly 3-cleft; the rudiment of a smooth filament between, and shorter than the two tallest stamens; anthers woolly; capsule 2-celled, 2-valved; seeds with membranous margins. (snake head.)

PENTSTE'MON. Calyx 5-cleft or 5-leaved; corolla ringent, inflated; the rudiment of a bearded filament between, and longer than the two tallest stamens; anthers smooth; capsule 2 celled, 2-valved, ovate; seeds numerous, angular. Taken from the last genus. (beard tongue.)

ZAPA'NIA. Flowers capitate; calyx 5-toothed; corolla 5-lobed; stigma peltately capitate, oblique; seeds 2, at first enclosed in an evanescent pericarp. (fog-fruit.)

AVICEN''NIA. Calyx 5-parted; corolla 2-lipped, the upper lip square; capsule coriaceous, rhomboid, 1-seeded, seeds germinating within the capsule.

HERPES''TIS. Calyx unequal, bi-bracted at the base; corolla tubular, somewhat 2-lipped; stamens included; capsule 2-valved, 2-celled; dissepiment parallel with the valves.

LIMOSEL''LA. Calyx 5-cleft; corolla 4-5-lobed, equal; stamens approaching by pairs; capsule 2-valved, partly 2-celled, many-seeded. (mad wort.)

RUEL''LIA. Calyx often 2-bracted; corolla somewhat bell form, border 5-lobed; stamens approaching by pairs; capsule smaller at the ends, toothed, dehiscent. (ruel.)

COLLIN''SIA. Calyx 5-cleft; corolla 2-lipped, throat closed, upper lip 2-cleft, lower lip 3-cleft; the bag-like, keeled segment closed over the declined stamens and style; capsule globose, seeds 2-3-umbilicate.

CONRAD''IA. Calyx 5-cleft, poliaceous; corolla monopetalous, cylindrical, sub-equal, 5-toothed at the apex, teeth reflexed; stamens 4, scarcely declined, sub-equal, long-exsert; style very long; stigma minute; capsule short ovate, 2-celled, many-seeded.

MARTYN''IA. Calyx 5-cleft; corolla ringent, with a ventricose tube; capsule 4-celled, 2-valved; each of the valves terminating in a long, hooked beak. (unicorn plant.) *S.*

CAPRA'RIA. Calyx 5-parted; corolla bell-form, 5-parted, acute; capsule 2-valved, 2-celled, many-seeded. *S.*

SEYME'RIA. Calyx deeply 5-parted; corolla sub-campanulate, 5 lobed; stamens near the throat; style declined; capsule inflated, ovate, acute. *S*

SESA'MUM. Calyx 5-parted; corolla bell form, 5 cleft; the lower lobe largest. The rudiment of a fifth stamen stigma lanceolate; capsule 4-angled, 4-celled. (oily grain.)

DIGITA'LIS. Calyx 5-parted; corolla bell-form, ventricose, 5-cleft; stigma simple or bilamellate; capsule ovate, 2 celled; flowers racemed. (fox-glove.) Ex.

CLASS XIV. TETRADYNAMIA.

ORDER I. SILICULOSA.

THLAS''PI. Calyx spreading, equal at the base; filaments distinct, without teeth silicle compressed, emarginate, obcordate many-seeded; valves resemble two boats with the keels outward. (shepherd's purse.

LEPID''IUM. Calyx spreading; corolla regular; silicle emarginate, cordate or oval; cells 1-seeded; valves carinate, dehiscent partition contrary; cotyledons incumbent. (pepper-grass.)

COCHLEA'RIA. Silicle thick, rugose, many-seeded, 2-valved; valves gibbous, obtuse; partition nearly parallel to the valves. (horse-radish, water-radish.)

CAK''ILE. [Bunias.] Panicle compressed, of 2 single-seeded joints; the upper joint with an erect single seed, inferior with a pendulous seed. (sea-rocket.)

DRA'BA. Silicle entire, oval or oblong; valves flat or convex; cells many-seeded, seeds not margined; filaments without teeth; style 0; cotyledons accumbent (whitloe-grass.)

ALYS''SUM. Calyx equal at the base; petals entire; stamens mostly toothed; silicle orbicular, or illiptical; valves flat, or convex in the centre; seeds 2 to 4 in each cell, compressed, sometimes membranously winged; cotyledons accumbent. (gold-of pleasure.)

CAMELI'NA. Silicle subovate, many-seeded; valves thick; cotyledons incumbent.

PLATYSPET''ALUM. Silicle oval, many-seeded; valves convex; styles very short; calyx a little spread; laminas of the petals dilated.

SUBULA'RIA. Silicle entire, ovate, concave (convex without); stigma sub-sessile seed linear, 2-plaited; cotyledons incumbent.

PLATYSPER''MUM. Silicle oval, compressed at the back, flat; stigma sessile; seeds few with broad margins; scapes numerous, 1-flowered.

CRAM''BE. Silicle globose, stalked, coriaceous, 1-celled, without valves, deciduous; seed solitary. (sea-kale.) Ex.

LUNA'RIA. Silicle entire, oval, flat, compressed, pedicelled; valves equalling the partition, parallel, flat; calyx consists of colored, sack-like leafets. (honesty, or satin-flower.) Ex.

VESICA'RIA. Silicle globose, inflated, with hemispheric valves; seeds more than 8, sometimes margined; petals entire.

ISA'TIS. Silicle compressed, oblong, ligulate, without valves, 1-seeded; partition like lattice-work. (woad.) Ex.

IBE'RIS. Corolla irregular, the two outer petals longest; silicle many-seeded, emarginate. (candy-tuft.) Ex.

THY'SANOCAR"PUS. Silicle obovate, plano-convex, broad-winged at both margins, emarginate at the apex, 1-celled, one seeded; seed broad-obovate, pendulous. Flowers small, and white.

CORONO'PUS. Silicle reniform, compressed, wrinkled; cells valveless, 1-seeded. *S.*

ORDER II. SILIQUOSA.

DENTA'RIA. Silique lanceolate; valves flat, nerveless, often opening elastically; receptacles not winged; funicle dilated; seeds in a single series, ovate, not margined; cotyledons accumbent. (tooth-root.)

NASTUR"TIUM. Silique teretish, abbreviated or declined; stigma somewhat 2-lobed; calyx equal at the base, spreading; seeds small, irregularly in two series, without margins.

TURRI'TIS. Calyx converging, erect; silique very long, striate, 2-edged; valves keeled or nerved; seeds arranged in a double series; cotyledons accumbent. (tower mustard.)

CARDAM"INE. Calyx leaves spreading but little; stigma entire; a single gland between each of the short stamens and the calyx; silique with truncate margins, linear, long, bursting elastically with revolute valves, narrower, but equalling the length of the partitions; seed with a slender funicle, not margined. (American water-cress.)

STREPTAN"THUS. Calyx erect, colored; petals dilated, having twisted, channeled claws; glands none; stamens with filaments subulate, and thickened at the base; silique very long, angled, compressed; seeds in one series, flat, margined; cotyledons accumbent.

AR"ABIS. Glands 4, one within each leafet of the erect calyx, of the size of the reflexed scale; silique compressed, torulose, sub divaricate; valves flat, 1-nerved; seeds arranged in a single series; cotyledons accumbent. (wall-cress.)

CHEIRAN"THUS. Calyx closed, two of the leafets gibbous at the base; petals dilated; silique, when young, with a glandular tooth each side; stigma 2-lobed; seed flat, sometimes margined. (stock-july flower, wall-flower.)

PHŒNICAU'LIS. Calyx colored, nearly equal at the base, much shorter than the entire unguiculate petals; silique ensiform, acuminate, flat, not opening elastically; cells about 3-seeded; valves with a prominent central nerve; seeds large, in a single series, not margined.

SINA'PIS. Calyx spreading; corolla with straight claws; glands between the short stamens and the pistil, and between the long stamens and the calyx; partition extending beyond the valves of the silique, ensiform, seeds in a single series. (mustard.)

RAPHA'NUS. Calyx closed, setose; silique torose, terete, not opening by valves, 1 or 2-celled; glands between the short stamens and pistil, and between the long stamens and the calyx. (radish.)

WA'REA. Silique 2-celled, stiped, flat, with a seed-bearing margin on both sides, seed flattish, striate; petals with long claws spreading; calyx deflected, caducous, colored.

BRAS"SICA. Calyx erect, converging; partition extending beyond the valves of the silique; seed globose; glands between the short stamens and pistil, and between the long stamens and calyx. (cabbage, turnip.) Ex.

BARBARE'A. Silique 4-edged; cotyledons accumbent; seeds in a single row; calyx equal at the base, erect; shorter filaments with intermediate glands. (water-radish.)

SISYM"BRIUM. Calyx mostly spreading, equal at the base; silique sub-terete; cotyledons incumbent, sometimes oblique, flat. (hedge-mustard.)

ERY'SIMUM. NASTUR"TIUM. Silique sub-terete, often short; valves concave, nerveless, not keeled; calyx equal, spreading; cotyledons accumbent. (English water-cress.)

HES"PERIS. Calyx closed, furrowed at the base, shorter than the claws of the petals; petals bent obliquely, linear or obovate; silique 4-sided, 2-edged; stigma sub-sessile of 2 lobes; cotyledons incumbent. (rocket.)

CLASS XV. MONADELPHIA.

ORDER III. TETANDRIA.

SISIRYN"CHIUM. Spatha 2-leaved; perianth 0; corolla superior, 6-cleft or 6-petalled, tubular; style 1; stigma 3-cleft; capsule 3-celled. (blue-eyed grass.)

TAMARIN"DUS. Petals 3, ascending; 3 filaments longer; legume 1 to 3-celled, pulpy inside. (tamarind.) Ex.

TIGRI'DIA. Calyx 0; petals 6; tube made by the union of the filaments, long. (tiger flower.) Ex.

ORDER V. PENTANDRIA.

PASSIFLO'RA. Calyx 5-parted, colored, corolla 5-petalled, on the calyx; nectary a triple, filamentous crown within the petals; gourd-like berry, pedicelled. (passion-flower.) *S.*

ERO'DIUM. Calyx 5-leaved; corolla 5-petalled; nectariferous scales 5, alternating with the filaments; arils 5, 1-seeded, awned; beaked at the base of the receptacle; awn spiral, bearded within. Taken from geranium. (stork's bill.) Ex.

OPLOTHE'CA. Calyx double, outer 2-leaved, convolute, truncate, scarious; inner calyx 1-leafed, muricate, somewhat 5-cleft. downy, longer than the outer calyx; nectary cylindric, 5-toothed, stamens in the nectary; stigma single, hairy; capsule bladder-like, enclosed in the calyx, 1 seeded. *S.*

ACHYRAN"THES. Calyx double, permanent, membranaceous · outer calyx 3-leav ed, inner 5-leaved, unequal; seed 1, covered by the converging calyx. *S.*

PHILOX″ERUS. Calyx 5-parted; corolla none; stamens united at the base into a small entire cup, shorter than the germ; anthers 1-celled; stigmas 2; bladder-like capsule membranaceous, 1-seeded, valveless. *S.*

MALACHODEN″DRON. Calyx bracted; petals 5-6; limb crenulate; germ 5-striate; stigmas capitate; capsules 5, united, seed 1. *S.*

ORDER VII. HEPTANDRIA.

PELARGO′NIUM. Calyx 5-parted, upper division broader, ending in a capillary nectariferous tube; corolla 5-petalled, irregular; the 2 upper petals usually broader, with colored veins; filaments 10, 3 of them usually without anthers; arils 5, each 1-seeded, awned; some of the awns spiral. (stork geranium.) Ex.

ORDER VIII. OCTANDRIA.

PIS′TIA. Spatha ligulate, hooded; corolla 0; filament lateral; anthers 3 to 8; style 1; capsule 1-celled, many-seeded. *S.*

ORDER X. DECANDRIA.

GERA′NIUM. Calyx 5-leaved; corolla 5-petalled, regular; nectariferous glands 5, adhering to the base of the 5 alternating long filaments; arils 5, 1-seeded, awned, beaked at the elongated top of the receptacle; awn naked or smooth within, straight. (cranebill, false crowfoot, herb robert.)

ACA′CIA. Polygamous; calyx tubular, 5-toothed; petals 5; stamens 5 to 10, exsert; pod 1-celled, 2-valved.

DARLINGTO′NIA. Calyx bell-form, 5-7-toothed; petals 5, distinct; stamens 5 to 10, sub-exsert; legume bivalve, juiceless, small-seeded, lanceolate-falcate.

SCHRANK″IA. MIMO′SA. Polygamous; calyx 5-toothed, tubular; petals 5; stamens 8 to 10, exsert; pod 4-valved.

ORDER XII. POLYANDRIA.

SI′DA. ABU′TILLON. Calyx simple, angular, 5-cleft; style many-parted; capsules many, arranged circularly, 1 celled, 1 or 3-seeded; pedicel articulate under the apex. (Indian mallows.)

AL″THÆA. Calyx double, outer one 6 or 9-cleft; capsules many, arranged circularly, 1 seeded. (hollyhock.)

MAL″VA. Calyx double, outer one 3-leaved, inner one 5-cleft; capsules many, arranged circularly, 1-celled, 1-seeded. (mallows.)

MALVAVIS″CUS. Calyx surrounded by a many-leaved involucre; petals erect, convolute; stigmas 10; carpels 5, 1-seeded, sometimes sub-distinct, and often united in 5-celled fruit.

HIBIS″CUS. Calyx double, outer one many-leaved; inner one about 5-cleft; stigmas 5; capsule 5 or 10-celled, many-seeded. (marsh mallows.)

LAVATE′RA. Calyx double, outer one 3-cleft; capsules many, seeds numerous. Ex.

STUART″IA Calyx 5-parted; petals 5; stigma 5-lobed; capsule 5-celled, 5-valved cells 1 or 2-seeded; seeds long, ovate. *S*

HO′PEA. Calyx superior, 5-cleft; petals 5; stamens united in 5 groups; style 1 drupe 3-celled. (yellow-leaf.) *S.*

NUTTAL″LIA. Calyx 5-cleft, simple; capsules many, 1-seeded, annular. *S.*

HALE′SIA. Calyx superior, 4-toothed; corolla 4-cleft; nut 4-sided, winged, covered with bark; 2 to 4-celled, 2 to 4-seeded. (snow-drop-tree.) *S.*

MAL″OPE. Calyx double, the exterior one 3-leaved; capsules clustered without order, 1 seeded. *S.*

STY′RAX. Calyx inferior, bell-form, 5-toothed; corolla 5 to 7-parted; stamens 6 to 16, united at the base, standing in the throat of the corolla; anthers oblong, linear. *S.*

GORDO′NIA. Calyx connate at the base, simple, 5-leaved; style 5-sided; stigmas 5 capsule 5-celled, 5-valved; receptacle columnar; cells 2-seeded; seeds winged. *S.*

GOSSYP″IUM. Calyx double, outer one 3-cleft; capsule 4-celled; seeds involved in a tomentose mass. (cotton.) Ex.

CLASS XVI. DIADELPHIA.

ORDER V. PENTANDRIA, TO ORDER VIII. OCTANDRIA, OR PENTOCTANDRIA.

CORYDA′LIS. Calyx 2-leaved; corolla ringent, 1 or 2-spurred at the base; filaments 2, membranaceous, each with 3 anthers; capsules silique-like, 2-valved, compressed, many-seeded. In some species the stamens are separate, with broad membranaceous bases. (colic-weed.)

DIELY′TRA. Petals 4, 2 outer ones equally spurred at the base; pod 2-valved, many-seeded. (Dutchman's breeches.)

FUMA′RIA. Calyx 2-leaved, caducous; corolla irregular, spurred, or gibbous at the base of one petal; filaments 2, each with 3 anthers; capsules or silicle drupe-like, 1-celled, 1-seeded, not opening by valves; seeds affixed to the side of the cell. (fumitory.)

ADLU′MIA. Sepals 2; petals united in a spongy persistent; monopetalous corolla, bigibbous at the base, 4-lobed at the apex; capsule pod-shaped, linear-oblong, many-seeded.

PETALOS″TEMON. Petals 5, nearly equal. 4 petals alternating with the stamens, and forming with them a cleft tube; legume included in the calyx, 1-seeded. *S.*

POLYG″ALA. Calyx 5-leaved, permanent unequal, 2 of the leafets wing-like, larger, colored; corolla irregular (or rather calyx 3-leaved; corolla imperfectly papilionaceous); capsule obcordate, 2-celled, 2 valved; keel of the corolla sometimes appendaged; seeds hairy (snake-root, milk wort, low centaury, mountain-flax).

ORDER X. DECANDRIA.

A. *Legume without transverse divisions or partitions; seeds numerous.*

PI′SUM. Calyx with the divisions leaf-like about equal; banner protruding 2 folds style compressed, carinate, villose above; legume without down at the suture. (pea.)

Lathy'rus. Calyx with the 2 upper divisions shorter; style flat, villose above, broader toward the top; stems mostly winged, leafets 2 or more, terminated by a divided tendril. (sweet pea.) *S.*

Vi'cia. Calyx emarginate above, 2-toothed, 3 straight long teeth below; banner emarginate; style bearded transversely on the lower side beneath the stigma. (vetch.)

Er"vum. Calyx 5-cleft, segments linear, acute, nearly equalling the corolla; stigma glabrous; legume oblong, 2-4 seeded. (creeping-vetch.)

Astro'phia. Calyx campanulate, 5-cleft, the 2 upper segments a little shorter; style flat, linear, pubescent along the inside; legume broadly-oblong, compressed, few-seeded.

Oro'bus. Style linear; corolla long; calyx obtuse at the base, upper segments deeper, often shorter. (bitter vetch.) *S.*

Pha'ca. Keel obtuse; style not pubescent; stigma capitate; legume 1-celled, inflated. *S.*

Phaseo'lus. Keel, stamens, and style, spirally twisted together; legume compressed, falcate; seeds sub-compressed, reniform. (bean.)

Strophos"tyles. Gly'cine. Keel, stamens, and style, spirally twisted together; legume terete, with a longitudinal half-breadth partition attached to one edge; seed reniform, sub cylindric. (wild bean.)

A'pios. Glyci'ne. Calyx somewhat 2-lipped, truncate, 1-toothed; keel of the corolla falcate, bending back the apex of the banner; germ sheathed at the base; legume coriaceous, many-seeded. (ground-nut.)

Amphicar"pa. Calyx bell-form, 4-toothed, obtuse, and naked at the base; petals oblong, banner broader, close pressed upon other petals, sub-sessile; stigma capitate; legume flat, stiped; seeds 2 to 4. (wild bean-vine.)

Robin"ia. Calyx small, bell-form, 4-cleft, upper division 2-parted; banner large, reflexed, roundish; legume compressed, elongated, many-seeded; seeds compressed, small. (locust tree.) *S.*

Galac"tia. Calyx 4-toothed, with 4 bracts at the base; petals oblong, standard incumbent; anthers oblong; stigma obtuse; germ on a naked stipe; legume terete, many-seeded.

Vexilla'ria. Calyx surrounded at the base by 2 longer bracts, 5-cleft; corolla resupinate; standard large, covering the wings; style dilated at the apex; legume linear, compressed, straight, 2-valved, many-seeded. (butterfly-weed.)

Astrag"alus. Keel obtuse; legume more or less completely 2-celled; lower suture inflexed. (milk-vetch.)

Gale'ga. Tephro'sia. Calyx with subulate teeth, nearly equal; standard large, roundish, pubescent without, reflexed, spreading, legume compressed, linear, many-seeded. (goat's rue.)

Medica'go. Keel of the corolla deflected from the standard; legume compressed, spiral. (lucerne clover.)

Colu'tea. Calyx 5-cleft, with the keel obtuse; style bearded on its back through its whole length; legume inflated, opening on the upper suture at the base. (bladder senna, bush locust.) Ex.

Glycyrrhi'za. Calyx tubular, equal, 5-parted, spurred at the base; standard erect, the sides reflexed; wings spreading; legume ovate; flowers in a raceme. (liquorice.) *S.*

Lupinas"ter. Calyx bell-form, 5-toothed; teeth setaceous, one under the keel; stigma hooked; legume terete, without joints. *S.*

Oxytro'pis. Keel mucronate; legume with the upper suture inflexed. *S.*

Indigofe'ra. Calyx spreading; keel with a subulate spur both sides; legume linear, small, terete or quandrangular. (indigo.) *S.*

Tri'gonel"la. Banner and wings subequal, spreading, resembling a 3-petalled corolla; legume often curved, compressed (fenu-greek.) *S.*

B. *Legume without transverse divisions or partitions; seeds few, or single.*

Melilo'tus. Flowers racemed; calyx tubular, 5-toothed; keel simple, shorter than the wings and banner; legume rugose, longer than the calyx, or about as long. (melilot clover.)

Trifo'lium. Flowers sub-capitate; legume included in the calyx, not opening by valves, 1 to 4-seeded; leaves always ternate. (clover.)

Do'lichos. Banner with two oblong, parallel, callous processes at the base, compressing the wings beneath them. (cowhage.) *S.*

Da'lea. Calyx half 5-cleft; corolla partly papilionaceous; wings and keel adnate to the undivided column of stamens; legume 1-seeded, included in the calyx. *S.*

Psora'lea. Calyx 4-cleft, lower segments elongated; legume the length of the calyx, 1-seeded, beaked. *S.*

C. *Fruit or loment in several joints, or in a single-seeded piece.*

Hedysa'rum. Calyx 4-cleft; keel of corolla transversely obtuse; loment many-jointed; joints 1-seeded, truncate, compressed, generally hispid; plants mostly with ternate leaves. (bush clover.)

Lespede'za. Calyx 5-parted, 2-bracted, divisions nearly equal; keel obtuse; legume 1-seeded; leaves always ternate. (bush clover.)

Æschynom"ene. Calyx 5-cleft, upper lip 2-cleft, lower lip 3-cleft; stamens in 2 equal sets; loment compressed, one suture straight, the other lobed.

Stylosan"thes. Calyx tubular, very long, bearing the corolla; loment 1-2 jointed, hooked.

Desmo'dium. Calyx with 2 bracts at the base, obscurely bi-labiate toward the middle, upper lip bifid, lower one 3-parted; corolla papilionaceous; standard roundish; keel obtuse, not truncate; wings longer than the keel; stamens diadelphous (3 and 1); filaments sub-persistent; legume with many joints; joints compressed, 1-seeded, membranaceous or coriaceous, scarcely dehiscent.

Ci′cer. Calyx 5-parted, of the length of the corolla, 4 upper divisions resting on the banner; legume turgid, 2-seeded. (chick-pea.) Ex.

Zor″nia. Calyx inferior, bell-form, 2-lipped; banner cordate, revolute; anthers half oblong, half globose; loment jointed, hispid. *S.*

Coronil″la. Calyx 2-lipped; petals with claws; loment teretish, jointed flowers in umbels; seeds generally cylindric. (coronilla.) Ex.

Sesba′nia. Calyx 5-toothed; legume terete jointed. Ex.

D. *Stamens united in one set.*

Amor″pha. Calyx somewhat bell-form, 4 or 5-cleft; banner ovate, concave; wings and keel 0; legume 1 or 2-seeded, falcate. (false indigo.)

Lupi′nus. Calyx 2-lipped; anthers, 5 oblong and 5 roundish; legume coriaceous, torulose. (lupine.)

Crotala′ria. Corolla with the banner cordate; large keel acuminate, the membrane formed by the united filament, has a fissure on the back; style curved; legume pedicelled, turgid. (rattle-box.)

Genis″ta. Calyx 3-lipped, upper lip with 2, lower lip with 3 teeth. (dyer's broom.)

Spar″tium. Stigma longitudinal, pubescent above; filaments adhering to the ovary; calyx lengthened at the base. (Spanish broom.) Ex.

U′lex. Calyx 2-leaved, 2-bracted; stamens all united; legume about the length of the calyx, spinose. (furze.) *S.*

Ara′chis. Calyx 2-lipped; corolla inverted; legume gibbous, torulose, veiny, coriaceous. (pea-nut.) Ex.

Pitch″eria. Calyx tubular, somewhat 2-lipped, 5-cleft, divisions subulate, upper lip bifid, equal to the lower one; wings narrow, subulate, 1-toothed; style filiform, ascending; legume oblong, 2-seeded, scarcely exceeding the calyx. *S.*

Erythri′na. Calyx 2-lipped; banner long, lanceolate; legume torulose, many-seeded. (coral-tree.) *S.*

CLASS XVII. SYNGENESIA.

ORDER I. POLYGAMIA ÆQUALIS.

A. *Florets ligulate.*

Cicho′rium. Calyx calycled; egret plumose, sessile, unequal; receptacle somewhat chaffy. (succory or endive.)

Leon″todon. Calyx double, imbricate, with flexible leafets; receptacle naked; egret stiped. (dandelion.)

Prenan″thes. Florets from 5 to 20, in a simple series (or in one circular row); calyx calycled; receptacle naked; egret simple, sub-sessile. (white lettuce.)

Lactu′ca. Calyx imbricate, cylindric, with the margin of the scales membranaceous; receptacle naked; egret simple, stiped; seed smooth. (lettuce.)

Hiera′cium. Calyx imbricate, ovate egret simple, sessile; receptacle naked, punctate, or sub-pilose. [From white becoming yellowish.] (hawk-weed.)

Apar″gia. Calyx imbricate; receptacle naked, punctate; egret plumose, sessile, unequal. (false hawk-weed.)

Son″chus. Calyx imbricate, swelling a the base; receptacle naked; egret simple sessile. (swine thistle.)

Kri′gia. Calyx many-leaved, simple; receptacle naked; egret double, exterior 5 to 8-leaved, interior of 5, 8, or 24 scabrous bristles. (dwarf dandelion.)

Troxi′imon. Calyx oblong, cone-like many-sepalled, sepals unequal, imbricate, receptacle naked; egret sessile, pilose. *S.*

Apo′gon. Calyx 8-sepalled, in a double series; receptacle naked; egret 0. *S.*

Chondril″la. Receptacle naked; egret pilose, stiped; calyx calycled; florets in many series. *S.*

Tragopo′gon. Calyx simple, many-leaved; receptacle naked; egret plumose and stiped. (goat's-beard, vegetable oyster.) Ex.

B. *Florets tubulous; flowers capitate.*

Arc″tium. Calyx globose, with scales hooked at the apex; egret chaff-bristly; receptacle chaffy. (burdock.)

Cni′cus. Calyx swelling, imbricate, with prickly scales; receptacle villose; egret caducous, plumose. (thistle.)

Car″du′us Calyx ovate, imbricate, with prickly scales; receptacle villose; egret pilose. (comb-tooth thistle.)

Cartha′mus. Calyx ovate, imbricate, with scales, ovatish, leafy at the apex; egret chaff-hairy, or none; receptacle chaff-bristly. (false saffron.) Ex.

Saussu′rea. Involucre sub-cylindric; scales imbricate, beardless; receptacle setose or chaffy; egret in 2 series, outer series short, filiform, inner one long and plumose anthers cordate, sub-entire; bony akenes glabrous.

Cyna′ra. Receptacle bristly; calyx dilated, imbricate, scales with fleshy bases emarginate and pointed; egret plumose, sessile. (garden artichoke.) Ex.

Ammo′bium. Anthers with 2 bristles at the base; chaffs of the receptacle distinct egret with toothed edge; sepals imbricated colored, radiated.

Onopor″don. Calyx ventricose, imbricate, with spreading, spinous scales; receptacle alveolate; egret capillary, deciduous scabrous. (cotton thistle.)

Lia′tris. Calyx oblong, imbricate; receptacle naked; egret plumose, persistent (mostly colored); seed pubescent, striate.

Verno′nia. Calyx imbricate, ovate; egret double, exterior short, chaffy, interior capillary; receptacle naked; stigma 2-cleft.

Stoke′sia. Involucre foliaceous, sub-imbricate; florets of the ray funnel-form and regular; receptacle naked; egret 4-bristled *S.*

STEVIA. Receptacle naked; egret chaff-bristled; involucre cylindric, from a simple series of leafets. *S.*

BRICKEL''LIA. Receptacle naked, dotted; egret hairy or scabrous; akenes nearly glabrous, 10-streaked; involucre many-leaved, imbricate. *S.*

C. *Florets tubulous; flower discoid.*

EUPATO'RIUM. Calyx imbricated (rarely simple), oblong; style long, cloven half way down; egret pilose, scabrous, or rough papillose; receptacle naked; seed smooth and glandular, 5-striate. (boneset, thoroughwort, joepye.)

MIKA'NIA. Calyx 4-6-leaved, 4-6-flowered; receptacle naked; egret pilose.

KUH'NIA. Calyx imbricate, cylindric; receptacle naked; egret plumose, sessile; seed pubescent, striate. (false boneset.)

POLYP''TERIS. Involucrum many-leaved, leaves oval; egret chaffy, many-leaved, the chaff broad-subulate, cuspidate, rigid, as long as the seed.

CHRYSOCO'MA. Calyx imbricate, oblong; receptacle naked; egret hairy, scabrous; seed pubescent. (golden-locks.)

CACA'LIA. Calyx cylindric, scaly at the base, receptacle naked; egret hairy. (wild-caraway.)

SPARGANOPH''ORUS. Calyx sub-globose, imbricate; scales secured at the point; receptacle naked; seed crowned with a cartilaginous, shining cup (water-crown-cup.) *S.*

MARSHAL''LIA. Involucrum imbricate; scales sub-lanceolate, incumbent; receptacle chaffy; egret 5, membranaceous, acuminate; nerveless scales.

MELANANTHE'RA. Involucrum imbricate; leafets ovate, close-pressed, sub-equal; receptacle chaffy; scales keeled, the lower part embracing the florets; egret consisting of 4 or 5 unequal, unarmed awns.

SANTOLI'NA. Calyx imbricate, hemispherical; scales keeled, with scarious points. *S.*

AGERA'TUM. Egret with 5 somewhat awned scales; leaves of the calyx oblong, in a double row; corolla 4 or 5-cleft; receptacle naked. Ex.

ORDER II. POLYGAMIA SUPERFLUA.

A. *Flowers discoid; the ray-florets being obsolete.*

TANACE'TUM. Calyx imbricate, hemispheric; scales acuminate; rays obsolete, 3-cleft; egret somewhat marginal; receptacle naked; flowers corymbed. (tansey.)

ARTEMI'SIA. Calyx imbricate, ovate, with scales rounded, converging; ray-florets subulate; egret 0; receptacle somewhat vilose, or nakedish; flowers mostly rounded. (wormwood, southern-wood.) *S.*

GNAPHA'LIUM. Calyx imbricate, with the marginal scales rounded, scarious, shortish, glossy, colored; receptacle naked; egret pilose or plumose, scabrous; florets of the ray subulate, of the disk entire. Sometimes all the florets are perfect. (life everlasting.)

CONY'ZA. Involucre imbricate, the scales appressed; receptacle naked; marginal florets fertile, 3-cleft; egret simple, capillary acines hairy.

BAC''CHARIS. Calyx imbricate, cylindric; scales ovate, sub-coriaceous; fertile florets mixed with the perfect; receptacle naked egret hairy. (groundsel-tree.)

PTEROCAU'LON. Involucre imbricate, with close-pressed, downy, sub-scarious scales; receptacle naked; perfect and pistillate florets intermixed, the pistillate ones slender, border 3-toothed, perfect ones with a 5-cleft border; egret hairy, scabrous akenes angled, hairy. *S.*

B. *Flowers radiate; the ligulate ray-florets very manifest.* [*Receptacle naked.*]

ERI'GERON. Calyx imbricate, sub-hemispherical; florets of the ray very numerous and narrow; egret double, outer minute, inner hairy, of few rays.

INU'LA. Calyx imbricate, generally squarrose; egret simple, scabrous, sometimes a minute, exterior, chaffy one; anthers ending in 2 bristles at the base; ray-florets numerous, always yellow. (elecampane.)

AS''TER. Calyx imbricate, the inferior scales generally spreading; egret simple pilose; receptacle often deep-pitted; florets of the ray more than 10, except in a few species; color purple or white, never yellow. (star-flower.)

SOLIDA'GO. Calyx oblong or sub-cylindric, with oblong, narrow, pointed, straight scales, imbricate, closed upon the flower; ray-florets about 5, and fewer than 10, lanceolate, 2-toothed, equal to, or shorter than the calyx; filaments capillary, very short; style thread-form, equalling the length of the stamens; stigma-cleft, spreading; egret simple, pilose, scabrous; receptacle furrowed with dots or punctures; seeds oblong, ovate; yellow. (golden-rod.)

TUSSILA'GO. Calyx simple, swelling, scales equal, and equalling the disk, sub-membranous; pistillate florets ligulate or without teeth; egret simple, sessile; sometimes polygamous. (colt's-foot.)

CHRYSAN''THEMUM. Calyx hemispherical, imbricate, with the scales membranous at the margin; egret none, or a narrow margin. (ox-eyed daisy, fever-few.)

BEL''LIS. Calyx hemispherical; scales equal; egret 0; receptacle conical; seed ovate. (garden daisy.) Ex.

TAGE'TES. Calyx simple, 1-leafed, 5-toothed, tubular; florets of the ray about 5 permanent; egret 5 erect awns. (mary gold.) Ex.

MATRICA'RIA. Involucre flat, imbricate, with scales having scarious margins; receptacle naked, terete; egret none. Ex.

TRI'CO'PHYL''LUM. Involucre oblong-cylindric, many-leaved, equal; ray-florets oblong; receptacle naked; egret chaffy, minute, 5 to 8-leaved; leafets obtuse, awnless. *S.*

PEC''TIS. Involucrum 5-leaved; ray-florets 5; receptacle naked; egret 3-5 awns.

ARNI'CA. Calyx hemispherical, leafets equal, longer than the disk, receptacle na ked egret simple, hairy; florets of the ray yellow, often destitute of anthers.

Sene′cio. Calyx sub-cylindric, equal, scaly at the base; scales withered at the points; receptacle naked; egret simple; rays sometimes wanting. (fire-weed.)

Cinera′ria. Involucre simple, many-leaved, equal; egret simple.

Bolto′nia. Calyx imbricate; rays numerous; receptacle conic, punctate; seeds flat; egret consisting of minute bristles, with 2 elongated and opposite bristles. (false chamomile.)

Chrysop″sis. Calyx imbricated; ray-florets mostly yellow; receptacle naked; egret double, outer one chaffy, minute, inner one scabrous, many-rayed. *S.*

Dah″lia. Receptacle chaffy; egret none; calyx double, outer one many-leaved, inner one 1-leaved, 8-parted. Ex.

[*Receptacle chaffy or hairy.*]

An″themis. Calyx hemispherical; scales with scarious margins, nearly equal; egret 0, or a membranous margin; florets of the ray more than 5; receptacle chaffs flat, with a rigid, acuminate apex; seed crowned with a membranous border or egret. (may-weed, chamomile.)

Achille′a. Calyx imbricate, ovate, unequal; egret 0; florets of the ray 5 to 10, roundish, dilated; flowers corymbed. (yarrow.)

Heliop″sis. Calyx imbricate, with ovate-linear lined scales; ray-florets linear, large; receptacle chaffy, conic; the chaffs lanceolate; seeds 4-sided; egret 0. (sun-ray.)

Hele′nium. Calyx 1-leafed, many-parted; egret 5-awned, chaffy leaves; receptacle globose, naked in the disk, and chaffy in the ray only; florets of the ray half 3-cleft; seed villose; leaves decurrent. (false sunflower.)

Verbesi′na. Calyx many-leaved; leafets disposed in a double series; rays about 5; receptacle chaffy; egret awned. (crown-beard.)

Eclip″ta. Involucrum many-leaved, the leaves nearly equal; florets of the disk 4-cleft; egret none; receptacle bristly. *S.*

Siegesbec″kia. Outer involucrum 5-leaved, spreading, inner one many-leaved, 5-angled, nearly equal; rays only on one side of the flower; receptacle chaffy; egret 0; akenes somewhat 4-sided. *S.*

Zin″nia. Calyx ovate, cylindric; rays 5, entire, permanent; receptacle chaffy; egret 2, erect awns. (blood marygold.) *S.*

ORDER III. POLYGAMIA FRUSTRANIA.

He′lian″thus. Calyx imbricate, sub-squarrose, leafy; receptacle flat, chaffy; egret 2-leaved, chaff-like, caducous. (sunflower, Jerusalem artichoke.)

Rudbeck″ia. Calyx consisting of a double series of leafets or scales; receptacle chaffy, conic; egret a 4-toothed margin, or 0. (cone-flower.)

Bi′dens. Calyx sub-equal, leafy or scaly at the base; rays often wanting; receptacle chaffy, flat; egret of 2 or 4 awns; seed quadrangular. (burr-marygold.)

Coreop″sis. Calyx double, each series many-leaved, the interior equal and colored, receptacle chaffy; scales flat; seed compressed, emarginate. *S.*

Centau″rea. Calyx various, mostly imbricate, roundish; egret simple, various; receptacle bristly; corollas of the ray funnel-shape, longer, irregular. (blue-bottle, blessed thistle.) Ex.

Lep″topo′da. Involucrum simple, many parted; rays 20 or more, 3-cleft, widening at the top; receptacle naked, hemispherical; egret consists of 8 to 10 awnless, chaff-like valves. *S.*

Galar″dia. Involucre many-leaved, flat, sub-equal; rays 3-cleft, widening toward the top; receptacle bristly, hemispherical; egret chaffy; leafets 8 to 10, awned. *S.*

Actinome′ris. Calyx simple, many-leaved, foliaceous, sub-equal, remote, elongated, 4 to 8; receptacle small, chaffy; seed compressed; margin crowned with 2 persistent awns.

ORDER IV. POLYGAMIA NECESSARIA.

Calen″dula. Calyx many-leaved, equal; receptacle naked; egret none; seeds of the disk membranaceous. (pot marygold.) Ex.

Silph″ium. Calyx squarrose, scales broad and leafy; receptacle chaffy; seed flat, obcordate, emarginate, bidentate.

Polym″nia. Calyx double, exterior 4 to 5-leaved, interior 10-leaved; leafets concave; receptacle chaffy; egret 0.

Gymnosty′les. Involucre many-leaved, the leafets in a single series; pistillate florets, apetalous; akenes compressed, somewhat toothed at the summit, awned with the permanent styles. *S.*

Parthe′nium. Involucrum 5-leaved rays very small; receptacle chaffy, minute outer scales dilated; akenes obovate, minutely 3-awned.

I′va. Calyx about 5-parted; florets of the ray 5; receptacle having seeds obovate, naked. (high-water shrub.)

Chry″sogo′num. Involucre 5-leaved; receptacle chaffy; egret 1-leaved, 3-toothed, akenes surrounded by a 4-leaved calycle. *S.*

ORDER V. POLYGAMIA SEGREGATA.

Elephanto′pus. Partial calyx 4-flowered; florets 5-cleft, ligulate, perfect; receptacle naked; down setaceous. (elephant foot.)

Echi′nops. Proper calyx 1-flowered corolla perfect, tubular; receptacle setose (globe-thistle.) Ex.

CLASS XVIII. GYNANDRIA.

ORDER I. MONANDRIA.

A. *Anthers adnate, sub-terminal, not caducous; masses of pollen affixed by the base, and made up of angular particles.*

Or″chis. Corolla ringent-like, upper petal vaulted; lip dilated, spurred beneath: masses of pollen 2 adnate, terminal. (orchis.)

PLATAN″THERA. Corolla vaulted; lips narrow, entire, spurred at the base; cells of the anther widely divided at the base by the broad interposed stigma; pollinia pedicelled; glands of the pedicels naked.

HABENA′RIA. Corolla ringent; lip spurred at the base beneath; stripes of the pollinia with naked and distinct glands; cells of the stalks adnate, or separated.

B. *Anther parallel with the stigma, not caducous; masses of pollen affixed to the summit of the stigma, and made up of farinaceous or angular particles.*

GOODYE′RA. Corolla ringent-like, the lower petals placed under the gibbous lip, which is divided above; style free; constituent particles of the masses of pollen angular. (rattlesnake-leaf, scrophula weed.)

NEOT″TIA. Corolla ringent, the 2 lower petals placed beneath the lip, which is beardless, interior petals converging; style wingless; pollen farinaceous.

LISTE′RA. Corolla irregular; lip 2-lobed, sessile, with no calli; column apterous; anther fixed by the base. (tway-blade.)

CRANI′CHIS. Corolla 5-petalled, resupinate, sub-ringent lip, vaulted behind.

C. *Anther inserted, terminal, not caducous; masses of pollen farinaceous or angular.*

POGO′NIA. Petals 5, distinct, without glands; lip sessile, cowled, crested internally; pollen farinaceous. (snake-mouth.)

CYMBID″IUM. Petals 5, distinct; lip behind, or inverted, unguiculate; the lamina bearded; style free; pollen angular. (grass pink.)

ARETHU′SA. Petals 5, connate at the base; lip below growing to the style, cowled above, crested within; pollen angular. (arethusa.)

TRIPHO′RA. Petals 5, distant, equal and connivent, without glands; lip unguiculate, cucullate; column spatulate, flattened, apterous. (three-bird-orchis.)

TIPULA′RIA. Segments of the perianth spreading; lip entire, sessile, with a conspicuous spur at the base beneath; column or style without wings, lengthened, free; anthers resembling a lid, permanent; pollinia (or masses of pollen) 4, parallel. (limodore.)

LIPA′RIS. MALAX″IS. Corolla spreading; petals 5; lip flat, expanded, entire, turned various ways; column or style winged; pollinia 4, parallel, affixed to the summit of the stigma.

MICROS″TYLIS. Lip flat, sagittate or deeply cordate; column very small, round; pollinia 4, loose.

CORALLORHI′ZA. Lip produced behind, adnate with the spur, or free; pollinia 4, oblique, not parallel. (coral-root.)

APLEC″TRUM. Lip unguiculate, not produced at the base; anther below the summit of the column; pollinia 4, oblique, lens-like.

CALYP″SO. Segments of the perianth ascending; petals 1-sided; lip ventricose, spurred beneath, near the end, column petaloid, dilated; pollinia 4.

EPIDEN″DRUM. Pollinia 4, parallel each mass with an elastic filament at the base; style united with the claw of the lip into a tube. (vanilla plant.)

ORDER II. DIANDRIA.

CYPRIPE′DIUM. Calyx colored, 4-leaved, spreading; corolla 0 (by some the calyx is called a corolla); nectary large, hollow, inflated; style with a terminal lobe, and petal-like appendage on the upper side. (ladies' slipper.)*

ORDER V. PENTANDRIA.

Plants bearing seeds in follicles, and pollen in masses called pollinia.

ASCLE′PIAS. Petals 5, reflexed; nectaries 5, concave, erect, containing little horns; each stamen with a pair of pendulous masses of pollen suspended from the top of the stigma; follicle smooth. (milk-weed, silk weed.)†

APOC″YNUM. Corolla bell-form; stamens with converging anthers, proceeding from the middle of the stigma, and alternating with 5 nectaries; stigma thick, almost sessile; follicles in pairs, long, linear. (dog-bane, Indian hemp.)

ACERA′TES. Corolla reflexed; 5 concave, short nectaries; each stamen with a pair of pendulous masses of pollen; follicle smooth; corolla with purple tips, much longer than the calyx.

ECHI′TES. Follicles 2, distinct, terete, seed crowned with a pappus; corolla funnel-shaped, with the border 5-parted; anthers adhering in the middle to the stigma; scales 5, fleshy, surrounding the base of the germ. *S.*

GONOLO′BUS. Corolla wheel-form, 5-parted; nectary cylindric, fleshy, 5-lobed; anthers opening transversely. terminated by a membrane; pollinia 5 pairs, not separating into grains; stigma flat; follicle 2, ventricose; seeds comose. (false choke-dog.)

PODOSTIG″MA. Stigma on a stipe; masses of pollen 10, smooth, pendulous; nectary 5-leaved; leaves compressed; corolla bell-form; follicles smooth. *S.*

PERIPLO′CA. Calyx 5-cleft; corolla rotate, 5-parted; orifice surrounded with an urceolate crown, terminating in 6 filiform awns; style 1; stigma 5-cornered; pollinia solitary, composed of 4 grains; follicles 2 divaricate. (milk-vine.)

AMSO′NIA. Follicles 2, erect; corolla funnel-shaped, with the throat closed; seeds terete, naked, with the summit obliquely truncate.

HOY′A. Corolla 5-cleft; pollen masses fixed by the base, conniving, compressed. stigma depressed with an obtuse wart; follicles smooth; seeds concave. Ex.

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* The ladies' slipper of the garden belongs to the genus Impatiens, of the class Pentandria.

† The genera in this order are, by many botanists, placed in the class Pentandria

Ensle′nia. Calyx small, 5-parted, permanent; corolla 5-parted; segments converging, erect; nectary 5-parted, petal-like, divided almost to the base; segments truncate, flat, each terminated by 2 central filaments; each stamen with a pair of pendulous, cylindric masses of pollen, suspended from the top of the conic stigma; follicles in pairs, small.

ORDER VI. HEXANDRIA.

Aristolo′chia. Calyx 0; corolla superior, 1-petalled, ligulate, inflated at the base; capsule 6-celled, many seeded. (birthwort.)

ORDER XII. POLYANDRIA.

As″arum. Calyx sub-campanulate, 3 to 4-cleft; corolla 0; anthers adnate to the middle of the filaments; capsule inferior, 5-celled, crowned with the calyx. (wild ginger.)

CLASS XIX. MONŒCIA.

ORDER I. MONANDRIA.

Zos″tera. Stamens and pistils inserted in 2 rows upon one side of a spadix; spatha foliaceous. Staminate flowers with the anthers ovate, sessile, alternating with the germs. Pistillate flowers with the germ ovate; style 2-cleft; drupe with 1 seed. (grass-wrack.)

Caulin″ia. Staminate flowers: calyx 0; corolla 0, anthers sessile. Pistillate flowers: calyx and corolla wanting; style filiform; stigma 2-cleft; capsule 1-seeded; flowers axillary. (river-nymph.)

Zannichel″lia. Staminate flowers: calyx and corolla wanting. Pistillate flowers: perianth single, of 1 leaf; ovaries 4 or more; style 1; stigma peltate; capsule sessile.

Cha′ra. Staminate flowers: calyx 0; corolla 0; anthers globose, sessile. Pistillate flowers: calyx 0; corolla 0; style 0; stigmas 5; berry 1-celled, many-seeded. (chara.) *S.*

Na′jas. Staminate flowers: calyx cylindric, 2-cleft; stamen filamentous, long; anther 4-valved, valves spreading. Pistillate flowers: calyx 0; style with 2 stigmas; nut 4-seeded.

Euphor″bia. Rarely a perianth; involucre monophyllous, campanulate, 8 to 10-toothed, the inner segments membranaceous. Staminate flowers 12 or more; calyx and corolla generally wanting. Pistillate flowers: solitary, central, stipitate; calyx and corolla 0, capsule 3-lobed. (spurge.)

ORDER II. DIANDRIA.

Lem″na. Staminate flowers: perianth of 1 leaf; stamens on the base of the germ. Pistillate flowers: perianth of 1 leaf; stigma funnel-form; capsule 1-celled, from 1 to 5-seeded. (duck's meat.)

Podos″temum. Staminate flowers: calyx 0; corolla 0; stamens affixed to a pedicel. Pistillate flowers: calyx 0; corolla 0; germ ovate; stigma 1, sessile; capsule 2-celled, 2-valved, many-seeded; seeds minute. (thread-foot.)

ORDER III. TRIANDRIA.

Ty′pha. Ament cylindric, dense-flowered. Staminate flowers: calyx obsolete, 3-leaved; corolla 0; stamens 3 together, on a chaffy or hairy receptacle, united below into 1. Pistillate flowers: below the staminate; calyx 0; corolla 0; seed 1, pedicelled; the pedicels surrounded at the base with long hairs resembling egret. (cat-tail, or reed mace.)

Sparga′nium. Ament globose. Staminate flowers: calyx 3-sepalled; corolla 0 Pistillate flowers: calyx 3-sepalled; corolla 0; stigma 2-cleft; drupe juiceless, 1 or 2-seeded. (burr-reed.)

Scle′ria. Staminate flowers: glume 2 or 6-valved, many-flowered; paleas awnless. Pistillate flowers; calyx 2 or 6-valved. 1-flowered; paleas none; stigmas 1 to 3; not colored, sub-globose. (whip-grass.)

Ca′rex. Aments imbricate, usually in cylindric spikes. Staminate flowers: calyx-scales single; corolla 0. Pistillate flowers: calyx-scales single; corolla inflated, monopetalous, 2-toothed at the apex; stigmas 2 or 3; nut 3-sided, enclosed in the inflated, permanent corolla, which becomes an utriculus-like permanent aril; sometimes diœcious. (sedge.)

Trip″sacum. Staminate flowers: glume 2-flowered, outer one staminate, inner one neutral; corolla a membranaceous glume. Fertile flowers: glume 1 or 2-flowered, surrounded by a 1-leafed involucrum perforated near the base; paleas with numerous thin membranaceous valves; styles 2; seed 1. (sesame grass.)

Compto′nia. Staminate flowers: ament cylindric, with calyx-scales 1-flowered; corolla 2-petalled or none; filaments 2-forked. Pistillate flowers: spike or ament ovate; corolla 6-petalled (the corolla may be called a calyx); styles 2; nut oval, 1-celled. (sweet-fern.)

Co′ix. Staminate flowers: in remote spikes; calyx-glume 2-flowered, awnless, corolla-glume awnless. Pistillate flowers: calyx-glume 2-flowered; corolla-glume awnless; style 2-parted; seed covered with the bone-like calyx. (Job's tear.) Ex.

Ze′a. Staminate flowers: calyx-glume 2-flowered, awnless; corolla-glume awnless. Pistillate flowers: calyx-glume 2-valved (number of valves increased by cultivation), style 1, very long, filiform, pendulous; seed solitary, immersed in an oblong receptacle. (Indian corn.) *S.*

Tra′gia. Staminate flowers: calyx 3-parted; corolla none. Pistillate flowers: calyx 5-parted; corolla none; style 3-cleft; capsule tricoccus, 3-celled; seed solitary. *S.* [Grasses found in class 3d vary into this order.]

ORDER IV. TETRANDRIA. TO ORDER VI. HEXANDRIA.

Al″nus. Staminate flowers: ament composed of wedge-form, truncate, 3-flowered receptacles; calyx a scale, 3-lobed; corolla 4-parted. Pistillate flowers: calyx 2-flowered scales, somewhat 3-cleft; corolla 0 seed compressed, ovate, wingless. (alder.)

Eriocau′lon. Involucre many leaved

florets many, in an imbricate head; partial perianth superior, 2 or 3-sepalled. Staminate flowers central, with monopetalous-cleft corollas. Pistillate flowers marginal, with 2-petalled corollas; stigmas 2 or 3; capsule 2 or 3-celled, 2 or 3-lobed; pericarp 1-seeded crowned with the corolla. (pipe-wort.)

Xan″thium. Monœcious. Staminate flowers: involucrum imbricate; anthers approximate, but not united; receptacle chaffy. Pistillate flowers: involucrum 2-leaved, 1-flowered; corolla none; drupe muricate, 2-cleft; nut 2-celled. (sea-burdock.)

Ur″tica. Staminate flowers: calyx 4-leaved; corolla 0; nectary central, cyathiform. Pistillate flowers: calyx 2-leaved, 2-valved; corolla 0; seed 1, glossy. (nettle.)

Mo′rus. Staminate flowers: calyx 4-parted; corolla 0. Pistillate flowers: calyx 4-leaved; corolla 0; styles 2, calyx becoming berry-like; seed 1. (mulberry.) *S.*

Bux″us. Staminate flowers: calyx 3-leaved; petals 2. Pistillate flowers: calyx 4-leaved; petals 3; styles 3. (box.) Ex.

Amaran″thus. Staminate flowers: calyx 3 or 5-leaved; corolla 0; stamens 3 or 5. Pistillate flowers: calyx and corolla as the staminate; styles 3; capsule 1-celled, opening transversely; seed 1. (amaranth, red cockscomb.)

Ambro′sia. Staminate flowers: common calyx 1-leafed; anthers in contact, but not united; corolla 1-petalled, 5-cleft, funnel-form; receptacle naked. Pistillate flowers: calyx 1-leafed, entire, or 5-toothed, 1-flowered; corolla 0; nut covered with the indurated calyx, 1-seeded. (hog-weed.)

Pachysan″dra. Calyx about 4-sepalled; corolla none; filaments sub-clavate; styles 3; capsules 3-horned, 3-celled; cells 2-seeded.

Schizan″dra. Calyx 9-sepalled; sepals in 3 series; corolla 0; anthers sub-sessile, cohering at the tips; berries 1-seeded, inserted on an elongated receptacle. *S.*

Parieta′ria. Polygamous. Perfect flowers: calyx 4-cleft, inferior; corolla none; stamens elastic; style 1; seed 1. Pistillate flowers: calyx 2-sepalled; nut covered with the dry elongated calyx. (pellitory.)

ORDER VI. HEXANDRIA.

Ziza′nia. Staminate and pistillate flowers mixed. Staminate flowers: calyx 0; corolla-glume 2-valved, awned. Pistillate flowers: glume 2-valved, hooded, awned; style 2-parted; seed inverted in the plaited, glume-like corolla. (wild-rice.)

Hydrochlo′a. Pistillate flowers: glumes none; paleas awnless. Staminate flowers: glumes none; paleas 2, awnless; stigmas 2, very long; seed 1, reniform.

Co′cos. See specific description.

ORDER XII. POLYANDRIA.

A. *Stems not woody.*

Sagitta′ria. Staminate flowers: calyx 3-leaved; corolla 3-petalled; filaments mostly 24. Pistillate flowers: calyx and corolla as in the staminate; germs many; capsules aggregate, 1-seeded, not opening. (arrow head.)

Ceratophyl″lum. Staminate flowers calyx many-parted; corolla none; stamens 16-20; anthers tricuspidate. Pistillate flowers: corolla none; style 1, filiform; nut 1-seeded. (horn-wort.)

My′riophyl″lum. Flowers monœcious, or rarely perfect. Staminate florets: calyx 4-parted; petals 4-lobed, alternating with the calyx, ovate, caducous; stamens 4-6, or 8. Pistillate flowers: calyx adhering to the ovary; limb 4-lobed; petals none; nuts 4, compressed or sub-globose, 1-seeded. (water milfoil.)

A′rum. Spatha cucullate, 1-leafed; spadix not entirely covered with the fructification, being more or less naked above, with pistillate flowers beneath, and staminate in the middle (sometimes a few are staminate beneath; berry mostly 1-seeded, generally cirrose-glandular beneath). (Indian, or wild turnip, wakerobin.)

Rensselae′ria. Spatha convolute; spadix covered with flowers, fertile at base, sterile above; perianth 0; berry 1-seeded. (spear arum.)

Cal″la. Spatha ovate, becoming expanded; spadix covered with the fructification; stamens intermixed. Staminate flowers: calyx and corolla 0; anthers sessile. Pistillate flowers: calyx and corolla 0; berries 1-celled, many-seeded, crowned with the short style. (water-arum.)

Pote′rium. Staminate flowers: calyx 4-leaved; corolla 4-parted; stamens 30 to 50. Pistillate flowers: calyx and corolla like the staminate; pistils 2; berry from the indurated tube of the corolla. (burnet.)

B. *Stems woody.*

Quer″cus. Staminate flowers: ament loose; calyx sub 5-cleft; corolla 0; stamens 5 to 10. Pistillate flowers: calyx 1-leafed, entire, scabrous, being a woody cup; style 1; stigmas 2 to 5; nut or acorn 1-celled, 1-seeded, coriaceous, surrounded at the base by the permanent calyx. (oak.)

Cory′lus. Staminate flowers: ament cylindric, imbricate; calyx a 3-cleft scale; pericarp none; stamens about 8. Pistillate flowers: calyx 2-parted, laciniate; stigmas 2; nut ovate, surrounded by and included in the permanent leaf-like calyx. (hazle-nut.)

Fa′gus. Staminate flowers: ament roundish; calyx 5 or 6-cleft, bell-form; stamens 5 to 12. Pistillate flowers: calyx 5-toothed, setose; germs 2, nuts 2, enclosed in the calyx, becoming coriaceous, echinate. (beech.)

Casta′nea. Polygamous. Staminate flowers: ament naked, linear; corolla or calyx 1-leafed, 5 or 6-parted; stamens 10 to 20. Pistillate flowers: calyx 5 or 6-leaved, or 5 or 6-lobed, muricate; germs 3; nuts 3, with coriaceous putamen enclosed in the calyx, becoming echinate. (chestnut.)

Be′tula. Staminate flowers: ament cylindric, imbricate; scales peltate, 3-flowered, stamens 10 to 12. Pistillate flowers: calyx a 2 or 3-flowered scale; seed 1, winged (birch.)

PLATA'NUS. Ament globose. Staminate flowers: corolla none, or scarcely apparent; anthers growing around the filaments. Pistillate flowers: calyx many-leaved; style with a recurved stigma; seed roundish, crowned with the mucronate style, with egret-like hairs at the base. (button-wood, false sycamore.)

JU'GLANS. Staminate flowers: ament imbricate; calyx a scale, generally 5-parted; corolla 4 or 5-parted; stamens 18 to 36. Pistillate flowers: calyx 4-cleft, superior; corolla 4-cleft or 4-parted; styles 1 or 2; drupe partly spongy; nut rugose and irregularly furrowed. (butternut, black-walnut.)

CAR'YA. Staminate flowers: ament imbricate; calyx of 3-parted scales; corolla 0; stamens 4 to 6. Pistillate flowers: calyx 4-cleft, superior; corolla 0; styles 0; stigma disk-like, 4-lobed; pericarp 4-valved; nut sub-quadrangular, even. (hickory, walnut.)

LIQUIDAM″BER. Staminate flowers: ament conical, surrounded by a 4-leaved involucre; perianth none. Pistillate flowers: ament globose; perianth 1-leafed, urceolate, 2-flowered; styles 2; capsules 2, 1-celled, many-seeded. (sweet gum-tree.) *S.*

OS″TRYA. Staminate flowers: ament cylindrical; scales 1-flowered; perianth 0; filaments branched. Pistillate flowers: ament naked; capsule inflated, imbricate. (iron wood, hop, horn-beam.)

CARPI'NUS. Staminate flowers: ament long-cylindric; scales ciliate at the base; stamens 8 to 14, somewhat bearded at the top. Pistillate flowers: strobilum loose; scales leafy, 2-flowered; stigmas 2; nut long, sulcate, 1-seeded. (horn-beam.)

ORDER XV. MONADELPHIA.

JATRO'PHA. Staminate flowers: calyx 5-leaved or wanting; corolla funnel-form; stamens 10, alternately shorter. Pistillate flowers: calyx 0; corolla 5-petalled, spreading; style 3-cleft; capsule 3-celled, seed 1. (physic-nut.) *S.*

CRO'TON. Staminate flowers: calyx 5-toothed; petals 5 or wanting; stamens 10 to 15. Pistillate flowers: calyx 5-leaved or none; corolla none; styles 2-cleft; capsule 3-grained, 3-celled, 3-seeded. *S.*

STILLIN″GIA. Staminate flowers: involucre hemispherical, many-flowered or wanting; perianth tubular, eroded; stamens 2 or 3, exsert. Pistillate flowers: calyx 1-flowered, inferior; style 3-cleft; capsule 3-grained. (tallow-tree.) *S.*

MELO'THRIA. Staminate flowers: calyx 1-flowered, 3 to 5-toothed; corolla bell-form; filaments 3. Pistillate flowers: calyx and corolla superior; style 1; stigmas 3; berry 3-celled, many-seeded. (creeping cucumber.)

MOMOR″DICA. Staminate flowers: calyx 5 or 6-cleft; corolla 5 or 6-parted; filaments 3. Pistillate flowers: style 3-cleft; berry gourd-like, and bursting elastically; seeds compressed. (balsam apple, wild cucumber.)

CU'CUMIS. Staminate flowers: calyx 5-toothed; corolla 5-parted; filaments 3. Pistillate flowers: calyx and corolla like the staminate; stigmas 3, thick, 2-parted; berry with pointed seeds. (cucumber, musk-melon.) Ex.

CUCUR″BITA. Staminate flowers: calyx 5-toothed; corolla 5-cleft; filaments 3. Pistillate flowers: calyx and corolla like the staminate; pistil 3-cleft; berry large, 3 to 5-celled; seeds thickened at the margin (gourd, squash, pumpkin, water-melon.) Ex.

RICI'NUS. Staminate flowers: calyx 5 parted; stamens numerous. Pistillate flowers: calyx 3-parted; styles 3, 2-cleft; capsules echinate, 3-celled, 3-seeded. (palma christi, or castor-oil plant.) Ex.

SIC″YOS. Staminate flowers: ament imbricate; calyx 5-toothed, teeth subulate, corolla 5-parted; filaments 3, or perhaps 5 in 3 sets. Pistillate flowers: style 3-parted; stigmas thick, 3-parted; fruit 1-seeded, often spinose. (single-seed cucumber.)

PI'NUS. Staminate flowers: calyx 4-leaved, peltate; corolla 0; stamens many; anthers naked, 2, sessile, 1-celled. Pistillate flowers: calyx in strobilums or cones; scales close-imbricate, 2-flowered; pistil 1; nut with a membranaceous wing, or a samara. (pine.)

CUPRES″SUS. Staminate flowers: ament ovate, imbricate; calyx a peltate scale; corolla 0; anthers 4, sessile. Pistillate flowers: ament strobilaceous; calyx a 1-flowered, peltate scale; corolla 0; germs 4 to 8, under each scale of the calyx; nuts angular, compressed. (white cedar.)

THU'JA. Staminate flowers: ament imbricate; calyx and corolla 0; anthers 4, sessile. Pistillate flowers: strobilum with the scales 2-flowered; corolla 0; nut 1, winged. (arbor vitæ.)

PHYLLAN″THUS. Staminate flowers: calyx 5 or 6-parted; filaments often columnar; anthers 3. Pistillate flower resembling the staminate; nectary a 12-angled margin; styles 3; capsules mostly 3-grained. (leaf-flower.)

ACALY'PHA. Staminate flower: calyx 3 to 4-parted; corolla 0; stamens 8-16. Pistillate flower: calyx 3-leaved; corolla 0; styles 3; capsule 3-celled. (three-seed mercury.)

CLASS XX. DIŒCIA.

ORDER II. DIANDRIA.

SA'LIX. Staminate flowers: ament cylindric; calyx a 1-flowered scale, with a nectariferous gland at the base; stamens 1 to 6 Pistillate flowers: ament and calyx like the staminate; stigmas 2, generally 2-cleft, capsule 1-celled, 2-valved; seeds many, with egret-like down. (willow.)

FRAX″INUS. Polygamous. Perfect flowers: calyx 0, or 3 or 4-parted; corolla 0, or 4-petalled; pistil 1; samara 1-seeded, with a lanceolate wing. Pistillate flowers: calyx, corolla, and pistils, same as perfect (ash.)

VALLISNE'RIA. Staminate flowers: spatha ovate, 2-parted; spadix covered with minute flowers; calyx 3-parted Pistillate flowers: spatha 2-cleft, 1-flowered; calyx 3-parted, superior; corolla 3-petalled; stigmas ligulate, 2-cleft; capsules without valves, 1-celled; seeds numerous, attached to the sides. (tape-grass.)

CERATIO′LA. Calyx bud-like, imbricated with 6 to 8 scales; corolla 0; stamens 2, exsert; stigmas 4 to 6, 2 of them longer; berry with 2 long seeds.

ORDER III. TRIANDRIA.

EMPE′TRUM. Calyx 3-parted, persistent. Staminate flowers: petals 3, marescent; stamens 3; filaments long; anthers 2-parted. Pistillate flowers: germ superior, depressed; style 0, or very short; stigmas 9, reflexed, spreading; berry round, 1-celled 2 to 6-seeded; seeds bony.

FI′CUS. Common receptacle fleshy (becoming the fruit), enclosing the apetalous florets; both staminate and pistillate, either in the same, or in distinct individuals. Staminate flowers: calyx 3-parted. Pistillate flowers: calyx 5-parted; pistil 1, lateral; seed 1, covered with the closed, permanent, somewhat fleshy calyx. (fig-tree.)

ORDER IV. TETRANDRIA.

VIS″CUM. Staminate flowers: calyx 4-parted; corolla 0; anthers sessile, adhering to the calyx. Pistillate flowers: calyx 4-leaved, superior; corolla 0; style 0; berry 1-seeded, globose; seed cordate; parasitic, adhering to trees. (mistletoe.)

MYRI′CA. Ament ovate, oblong; scales lunulate. Staminate flowers: stamens 4 to 6; anthers 4-valved. Pistillate flowers: germ 1; stigmas 2; drupe 1-celled, 1-seeded. (bay-berry.)

BROUSSONE′TIA. Staminate flowers: ament cylindrical, calyx 4-parted. Pistillate flowers: ament globose; calyx tubular, 3 or 4-toothed; germ club-shaped; seed 1, covered with the calyx. (paper mulberry.) *S.*

ORDER V. PENTANDRIA.

XANTHOX″YLUM. Staminate flowers: calyx 5-parted; corolla 0; stamens 3 to 6. Pistillate flowers: pistils 3 to 5; capsules equal to the number of pistils, 1-seeded. (prickly-ash, or toothache-tree.)

HU′MULUS. Staminate flowers: calyx 5-leaved; corolla 0; anthers with 2 pores at the extremity. Pistillate flowers: calyx 1-leafed, entire, oblique, spreading; styles 6; seed 1, within the leaf-like calyx; inflorescence strobile-form. (hop.)

NYS″SA. Perfect flower: calyx 5-parted; corolla 0; pistil 1; drupe inferior; nut 1-seeded. Staminate flowers 5, 8, 10, or 12, inserted around a peltate gland. (pepper-idge-tree.)

HAMILTO′NIA. Perfect flowers: calyx sub-campanulate, superior, 5-cleft; corolla 0; nectary with a 5-toothed disk; stamens 5; pistil 1; fruit a drupe. Staminate flowers vary only in having no pistil. (American oil-nut.)

ACNI′DA. Staminate flowers: calyx 5-parted; corolla 0. Pistillate flowers: calyx 3-parted; corolla 0; styles 0; stigmas 8. sessile; capsule 1-seeded. (water hemp.)

CAN″NABIS. Staminate flowers: calyx 5-parted. Pistillate flowers: calyx 5-leaved, entire, gaping laterally; styles 2; nut 2-valved, within the closed calyx. (hemp.) Ex.

SPINA′CIA. Staminate flowers: calyx 5-parted; corolla 0. Pistillate flowers: styles 4; seed 1, within the indurated calyx. (spinach.) Ex.

NEGUN″DO. Calyx minute, unequally 4-5-toothed; petals none; anthers 4-5, linear, sessile; pedicels of the staminate flowers capillary, fascicled from lateral aggregate buds; fertile flowers in racemes; samaras in pairs, diverging, 1-seeded; leaves compound, pinnately 3-5 foliate.

ORDER VI. HEXANDRIA.

SMI′LAX. Staminate flowers: calyx 6-leaved; corolla 0; anthers adnate to the filaments. Pistillate flowers: style minute, stigmas 3; berry 3-celled, superior, 1-3-seeded. (green-brier.)

DIOSCORE′A. Staminate flowers: calyx 6-parted; corolla 0; styles 3; capsule 3-celled, triangular, compressed; cells 2-seeded; seeds with membranaceous margins. (yam-root.) *S.*

GLEDITSCH″IA. Perfect flowers: calyx 6 or 8-parted, deciduous, 3 or 4 of the exterior segments smaller; corolla 0; stamens 5 or 6, seldom 8; legume flatly compressed, 1 or many-seeded. Staminate flowers: calyx sub-turbinate, 5-8-parted; 3 to 5 of the segments interior; stamens 6 to 8. (honey-locust.) *S.*

ORDER VIII. OCTANDRIA.

POP″ULUS. Staminate flowers: ament cylindric; calyx a torn scale; corolla turbinate, oblique, entire, supporting 8 to 30 stamens. Pistillate flowers: ament, calyx, and corolla, like the staminate; stigma 4 or 6 lobed; capsule 2-celled, 2-valved, many-seeded; seed with egret-like hairs; leaves having a tremulous motion. (poplar, balm of Gilead.)

DIOSPY′ROS. Calyx 4 to 6-cleft, dilated, corolla urceolate, 4-6-cleft. Staminate flowers: stamens 8 to 16; filaments often with 2 anthers. Pistillate flowers: stigmas 4-5 berry 8-12-seeded. (date plum.) *S.*

HIPPO′PHÆ. Staminate flowers: perianth 4-cleft; stamens 8, alternating with 8 glands. Pistillate flowers: perianth superior, campanulate; style 1; stigma oblique; berry 1-seeded. (sea-buck-thorn.)

ORDER IX. ENNEANDRIA.

UDO′RA. SERPIC″ULA. ELO′DEA. Spatha 2-parted; perianth 6-parted, 3 inner segments petaloid. Staminate flowers: stamens 9, 3 of them interior. Pistillate flowers: tube of the perianth very long; barren filaments 3; utricle about 3-seeded; seeds cylindric. (ditch-moss.)

HY′DROCHA′RIS. Staminate flowers: spatha 2-leaved; calyx 3-leaved; corolla 3-petalled; stamens 8-12, united at the base. Pis tillate flowers: spatha 1-leaved, 1-flowered; calyx 3-leaved; corolla 3-petalled, with 6 glands between the petals; germ inferior; styles 6, 2-cleft; capsule 6-celled, many-seeded. *S.*

ORDER X. DECANDRIA.

Gymnocla′dus. Staminate flowers: calyx tubular, 5-cleft; petals 5. Pistillate flowers: style 1; legume 1-celled, pulpy within; seed roundish, large, and hard. (coffee-bean.)

Car″ica. Staminate flowers: calyx minute; corolla funnel-form, 5-cleft; stamens alternately shorter, enclosed in the tube of the corolla. Pistillate flowers: calyx 5-toothed; petals 5; stigmas 5; berry cucumber-form, grooved, 1-celled, many-seeded. (false papaw-tree.) *S.*

ORDER XII. POLYANDRIA.

Menisper″mum. Staminate flowers: calyx 2-bracted, about 6-leaved, caducous; petals 6-9, glandular, minute, retuse; stamens 16-24; anthers adnate to the filaments, 4-lobed, 2-celled. Pistillate flowers: germs and styles 3-6; drupes mostly solitary, 1-seeded; nut lunate, compressed.

Cy′cas. Staminate flowers: ament imbricated; scales spatulate, single; anthers globose, sessile, on a scale. Pistillate flowers: spadix compressed, 2-sided; perianth a scale.

Za′mia. Ament a strobile. Staminate flowers: scales obovate; anthers globose, sessile upon scales, opening by a fissure. Pistillate flowers: scales peltate; corolla none; germs 2; styles none; berries 2, 1-seeded.

Datis″ca. Staminate flowers: calyx 5-leaved; corolla 0; anthers sessile, about 15. Pistillate flowers: calyx superior, 2-toothed; styles 3; capsules 3-angled, 3-horned, 1-celled, many-seeded. (false hemp.)

Thalic″trum. See class 12: 12.

ORDER XV. MONODELPHIA.

Junipe′rus. Staminate flowers: ament ovate, whorled; calyx a peltate scale; anthers 4 to 8. Pistillate flowers: calyx 3-parted; petals 3; styles 3; berry 1 or 2-seeded; nut long, 1-celled, with balsamy glands at the base. (red cedar.)

Tax″us. Staminate flowers: calyx consists of 4 to 6 imbricate scales; corolla 0; stamens 8 to 10; anthers peltate, 6 to 8-cleft. Pistillate flowers: style 0; receptacle succulent; nut or drupe fleshy, 1-seeded. (yew.)

CLASS XXI. CRYPTOGAMIA.

ORDER I. FILICES.

A. *Capsule having an elastic ring at right angles with its opening.*

Polypo′dium. Capsules disposed in round, scattered fruit-dots (or clusters of capsules), on various parts of the lower surface of the frond; involucrum 1. (polypod.)

Acros″tichum. Capsules numerous, covering the lower surface of the frond; involucrum none. The fertile leaves differ in shape from the barren. When old, the fruit often covers the whole frond. (fork-fern.)

Hypopel″tis. Fruit-dots roundish, having a cup-form involucre beneath, divided into 5 or 6 irregular segments; capsules all sessile.

Aspid″ium. Capsules in scattered, roundish fruit-dots, on various parts of the whole lower surface of the frond; involucrum a kidney-form, or round membrane, fastened to the frond in or near the centre of the fruit-dot, and opening on all sides, or to one side of the fruit-dot, and opening on the other. The involucrum, when a little opened, is often peltate. (shield-fern.)

Asple′nium. Sori in lines parallel to each other, situated exactly *upon* the secondary veins of the frond; involucres opening inward. (spleen-wort, walking-leaf.)

Scolopen″drium. Sori linear, transverse, scattered; involucrum double, occupying both sides of the sorus, superficial, at length opening longitudinally. (caterpillar-fern.)

Pte′ris. Capsules arranged in a continued line along the very margin of the frond; involucres opening inward, being formed of the inflexed margins of the fronds. When the leaves are extremely small, the rows of capsules on opposite sides meet and cover the lower surface. (brake.)

Adian″tum. Capsules disposed in oblong fruit-dots, arranged along the margin of the frond; involucrum is formed by turning back the margin of the frond over the capsules, and it opens inward. The lines of oblong spots are generally along that margin, which may be considered the end of the leaf, or of the segments of the leaf. (maidenhair.)

Ono′clea. Fruit-dots indeterminate, presenting a berry-like appearance; capsules covering the whole lower surface of the frond; involucrum formed by turning in or rolling back the margin of the leaf, which opens inward, in maturity, toward the midrib, or remains closed. The fertile leaves are contracted, and narrower than the barren ones. (sensitive polypod.)

B. *Capsule without a ring—being cellular-reticulate, pellucid, sub-striate, radiate at the tip.*

Lygo′dium. Capsules sessile, ovate; 2 ranks of small spikes issuing from the margin of the frond, radiate-striate or wrinkled, opening on the inner side from the base to the summit; involucrum scale-like, covering each capsule.

Schizæ′a. Capsules with radiating furrows at the top, somewhat turbinate, bursting laterally, sessile; involucrum continuous, formed of the inflexed margin of the unilateral spikes.

Osmun″da. Capsules globose, pedicelled, radiate-striate or wrinkled, having a hinge at the joining of the 2 valves, which resembles part of the jointed ring of annulated ferns; the capsules either occupy the whole frond, to a limited extent, or a panicled raceme. The parts of the frond occupied by the fruit are always more contracted than the barren parts. (flowering fern.)

C. *Capsule without a ring—being adnate at the base, sub-globose, coriaceous, not cellular, somewhat 2-valved.*

Ophioglos″sum. Capsules round, 1-celled, opening transversely; they are placed on a somewhat jointed spike in two close rows. (adder-tongue fern.)

Botrych″ium. Capsules coriaceous, globose, 1-celled, smooth, adnate to each rachis of a compound raceme, separate; valves 2, connected behind, opening transversely. (grape fern.)

D. *Sub-order,* Apteres—*without pinnate, pinnatifid, or other winged leaves.*

Lycopo′dium. Capsules mostly kidney-form, or roundish, 2 or 4-valved, opening elastically; they are placed under separate scales in a spike, or sometimes in the axils of the leaves; leafy, their stems being generally covered with 2, 3, or 4 rows of narrow, simple, entire leaves. (ground pine.)

Equise′tum. Fruit placed under peltate polygons, being pileus-like bodies, which are arranged in whorls, forming a spike-form raceme; 4 to 7 spiral filaments surround the seed, which resemble green globules. Fertile plants mostly leafless; the stems of all are jointed with toothed sheaths at every joint, and usually longitudinally striated and hollow. (scouring-rush, horse-tail.)

Salvin″ia. Involucres 4-9, imbricate, connate, resembling a 1-celled capsule; sporules inserted upon a central receptacle.

ORDER II. MUSCI.

Funa′ria. Teeth of the outer peristome* 16, cohering together at the apex and twisted obliquely; the inner peristome consists of 16 membranaceous hairs, opposite to the teeth, lying flatly.

Polytri′chum. Peristome very short; teeth 16, 32, or 64; mouth of the germ covered by a dry membrane, which is connected to it by the teeth of the peristome; calyptra very small, with a large villose or hairy covering.

ORDER III. HEPATICÆ.

Marchan″tia. Receptacles pedicelled, radiate-lobed, disk-like, or bell-form, with the inside downward, to which the globose 4-valved capsules are attached with their apexes downward. The umbrella-like receptacle is elevated one or two inches by a stipe attached to the centre of its lower side, among the capsules and many pilose appendages. The frond is leafy, reticulate, furnished with a midrib, and beset with villose roots on the under side, which attach themselves to the stones in brooks, to damp earth, &c.

Jungerman″nia. Capsules 4-valved, globose, elevated by peduncles or stipes from within a bell-form calyx. The fronds are made up of finer leaves than those of the Marchantia, and are often mistaken for mosses, among which they generally grow

ORDER IV. ALGÆ.

A. *The section* Fucoideæ *comprises those sea-weeds of the old genus Fucus, whose fronds are cartilaginous or leathery, and of an olive or copper color, becoming brown or black. They are composed of interwoven, longitudinal fibres. The floating vesicles appear like portions of the frond blown up in bubbles.*

Fu′cus. Receptacles tubercled; tubercles perforated, nourishing aggregated capsules within, intermixed with articulated fibres.

B. *The section* Florideæ *comprises those sea-weeds of the old genus Fucus, whose fronds are leathery, membranous, or gelatinous, and of a purple or rose color.*

Halyme′nia. Frond membranaceous, leathery, nerveless, punctate; seed immersed throughout the whole frond, disposed in spots.

C. *The section* Ulvoideæ *comprises the plants of the old genus Ulva. Fronds membranaceous (broad, or in narrow slips), thin, of a grass-green color. Their substance consists of cells, with the fruit immersed in the frond. They grow on rocks, stones, shells, &c., in the sea; also in ditches, stagnant waters, damp woods &c.*

Ul″va. Seeds in fours, immersed in every part of the membranaceous frond.

D. *The section* Confervoideæ *comprises the plants of the old genus Conferva Fruit capsular or naked granulations Fronds filiform and geniculate, containing the fruit immersed in them, generally strung on threads; mostly of a grass green or greenish color, sometimes purple. They grow in fresh-water streams, springs, ditches, and stagnant waters sometimes in damp woods, and some in the sea.*

Confer″va. Filaments articulated, uniform, simple or branched, containing the seed within them. No external fruit.

E. *The section* Tremellinæ *comprises the old genus Tremella. Plants of this section are all gelatinous, hyaline, and covered with a membrane. They are globose, palmate, or filiform, and contain conferva-like filaments within. Color green or purplish. They resemble Confervoideæ in habit and place of growth.*

Nos″toc. Filaments moniliform, constituted from coadunate globules. Fronds bullate, vesicular (at length becoming flattened), crowded with simple moniliform curve-crisped filaments.

ORDER V. LICHENES.

Gyropho′ra. Frond foliaceous, coriaceous-cartilaginous, peltate, monophyllous (when luxuriant, polyphyllous), free beneath; apothecia somewhat shield-form, sessile-adnate, clothed with a dark membranaceous cartilage, including a somewhat solid parenchymous substance; disk warty or circinal, plicate and margined.

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* The *peristome* is the membrane which appears round the mouth of the capsule of mosses, under the lid

PARME′LIA. Frond coriaceous, sub-membranaceous, flat, expanded, close-pressed, orbicular, stellate and lobed, or multifid-laciniate, having fibres beneath; apothecia shield form, sub-membranaceous, formed under side from the frond, free, with a central puncture by which it is affixed; disk concave, colored, covering the whole receptacle above, within similar, sub-cellular, and striate, cut round, inflexed with a frond-like margin.

CETRA′RIA. Frond cartilaginous or membranaceous, ascending or expanded; lobe laciniate, smooth and naked both sides; apothecia shield-like, obliquely attached to the margin of the frond, the lower free, being separated from it, the upper one sessile; seed-bearing lamina forming the disk, colored, plano-concave, surrounded with a frond like inflexed margin.

CENOMY′CE. Frond crusty or cartilaginous, foliaceous, laciniate, sub-imbricate free (rarely adnate); bearing sub-fistulous peduncles (*podetia*) both barren and fertile; receptacles (knobs) orbicular, without margins, at length convex and capitate, inflated or empty beneath, terminal attached to the peduncles by their peripheries; seed-bearing lamina forming the receptacle above, thickish, colored, similar within, convex, reflexed, and attached at the periphery, invested beneath with the woolly integument of the frond.

BÆOMY′CES. Frond crustaceous, flat, expanded, adnate; bearing soft, solid, fertile podetia; apothecia capitate, without margins, solid, terminal, sessile on the peduncles; seed-bearing lamina covering the whole receptacle and adnate to it, convex reflexed, thickish, colored, similar within.

US″NEA. Frond sub-crustaceous, teretish, branched, mostly pendulous; central part hyaline, elastic, composed of fascicles of tubes; receptacles orbicular, terminal, peltate, formed wholly from the frond, covered all over with its cortical substance, similar, nearly of a uniform color; its periphery destitute of margin, but often surrounded by a ciliate edging.

ORDER VI. FUNGI.

LYCOPER″DON. Receptacle somewhat caulescent, at length bursting at the top with scaly warts or prickles scattered over its surface, especially when young. Seminal dust green.

MU′COR. Receptacle membranaceous globose, stiped, at first watery and pellucid then opake; seeds naked, sub-cohering very minute and fugaceous.

URE′DO. Receptacle 0; seminal dust under the cuticle of leaves and stems, when ruptured it is easily brushed off; the little masses of seeds uniform, mostly globose.

AGAR″ICUS. Destitute of a volva at the base of the stipe, with or without the ring; lamellæ either entire or with shorter ones intermixed, rarely simple, ramose, never veiny.

BOLE′TUS. Pileus various; tubes and pores terete, entire. A large genus.

SECTION IV.

SPECIES OF PLANTS.

The names in Italics following the figures, stand for the natural families of Jussieu, which are now superseded by an improved system of classification. See Table commencing at page 21 *of the Appendix.*

ABI'ES. See *Pi'nus.*

ABU'TILON. See *Si'da.*

ACA'CIA. 15—10. (*Leguminosæ.*) [From the Greek *aka'zo*, to sharpen.]

glandulo'sa, (w. Ju. ♃.) leaves bipinnate, leafets 12-paired, glands between each pair; spikes globose, solitary, peduncled, axillary; legume falcate; unarmed. *S.*

farnesia'na, (black thorn, y. ♄.) leaves bipinnate, leafets 8-paired; spikes globose, sessile. Flowers fragrant; legumes fusiform. *S.*

ACAL″YPHA. 19—15. (*Euphorbiæ.*) [From the Greek *a*, not, *kalos*, agreeable, *aphe*, to the touch.]

virgin″ica, (three-seeded mercury, g. Au. ⊙.) pubescent; leaves on short petioles, lanceolate-oblong, remotely and obtusely serrate; involucre cordate, ovate, acuminate, toothed; fertile flowers at the base of the sterile spike. *Road-sides.* 12 to 18 i. Var. *car'olinia'na*, with longer petioles and broader leaves.

A'CER. 8—1. (*Acera.*) [Latin *acer*, acrid, referring to the juice of some of the species.]

da'sy car'pum, (white maple, silver maple, g-y. ♄). leaves palmate, 5-lobed, truncate at the base, unequally gash-toothed, glabrous and glaucous beneath, obtusely sinuate; flowers glomerate; pedicels short; germs downy. 50 f. Fruit a *samara.*

barba'tum, (hairy maple w-g. Ap. ♄.) leaves heart-ovate, short, 3-lobed, unequally serrate, glaucous beneath, and hairy at the nerves; peduncles hairy, staminate ones branching, pistillate ones simple; calyx bearded within; wings of the capsules erect; small. 15 f.

ni'grum, (sweet tree, black maple, y. Ap. ♄.) leaves palmate, 5-lobed, cordate, with the sinus at the base closed, lobes spreading, sinuate-toothed, downy beneath; flowers corymbed; capsules turgid, subglobose; wings diverging. Large tree, affording almost as much sugar as the sugar maple. 50 f.

spica'tum, (mountain maple bush, y-g. M. ♄.) leaves sub-5-lobed, acute, toothed, pubescent beneath; racemes compound, erect. 15 f. *Mountains.*

ru'brum, (red maple, soft maple, r. Ap. ♄.) leaves palmate, 5-lobed, cordate at the base, unequally gash-toothed, glaucous beneath, sinuses acute; flowers in about fives, in sessile umbels, with long pedicels; germs glabrous; stamens variable. Precocious. 50 f.

sacchari'num, (sugar maple, rock maple, hard maple, r. y. M. ♄.) leaves palmate, 5-lobed, at the base sub-cordate, acuminate, sinuate-toothed, glaucous beneath; peduncles in a nodding corymb. Large tree 50 f. *Fruit ovoid, smooth, the wings about an inch long.*

stri'a'tum, (striped maple, false dogwood, moosewood, g. M. ♄.) lower leaves roundish, upper ones 3-cuspidate-acuminate, sharply serrate, glabrous; racemes simple, pendant. Small tree, with a greenish, striped bark. 15 f.

ACER″ATES.* 18—5. (*Asclepiadæ.*) [From the Greek *a*, without, *keras*, horn.]

virid″iflo'ra, (green milkweed, g. Ju. ♃.) stem erect, simple, hairy; leaves oblong, on short petioles, tomentose, obtuse; umbels lateral, solitary, sub-sessile, nodding, dense flowered; umbels about 3; horns of the nectary wanting. Sandy fields Stem 2 f.

ACHILLE'A. 17—2. (*Corymbiferæ.*) [From the Greek warrior *Achilles.*]

millefo'lium, (yarrow, milfoil, w. J. ♃.) leaves 2-pinnatifid, downy, the divisions linear, toothed, mucronate; calyx and stem furrowed; flowers in large, dense, terminal corymbs; rays about 5; disk-florets few; receptacle flat, chaffy, the chaff lance-oblong. *Naturalized.* 15 i. *S.*

ACHYRAN″THES. 15—5. (*Amaranth* [From the Greek *achu'ron*, chaff, and *anthos*, flower.]

re'pens, (forty knot, March. ♃.) stem procumbent, pubescent; leaves opposite, petioled, lanceolate. Flowers in heads.

ACNI'DA. 20—5. (*Chenopodeæ.*) [From the Greek *a*, wanting, *knide*, a sting.]

cannabi'na, (water hemp, w. g. Ju. ⊙.) leaves ovate-lanceolate; capsules smooth, acutely angled. Marshes. Can. to Flor. Flowers small, green, in large panicles.

ACONI'TUM. 12—5. (*Ranunculaceæ.*) [From the Greek *akone*, rugged, in allusion to its habit.]

uncina'tum, (monk's hood, b. J. ♃.) stem flexuose; leaves palmate, 3 to 5-parted, divisions rhomb-lanceolate, gash-toothed; upper lip of the corolla lengthened, convex, beaked; stem twining, branching. *Grows on mountains and rough places. Cultivated.* 2 f.

napel″lus, (wolf's bane, b. J. ♃.) leaves shining, 5-parted, the divisions 3-parted, subdivisions linear; upper lip of the corolla lanceolate, ascending, 2-cleft, spur straight obtuse. 2 f. Ex.

ACO'RUS. 6—1. (*Aroideæ.*) [From *a*, without, and *kore*, the pupil, because it was esteemed good for disorders of the eyes.]

cal″amus, (sweet flag, g-y. J. ♃.) spike protruding from the side of an ensiform leaf; scape leafy above the spadix; leaves 3–4 feet long; water or wet grounds; root creeping, strongly aromatic. 2 f.

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* This genus is scarcely distinct from Asclepias.

ACROS″TICHUM. 21—1. (*Filices.*) [From *akros*, highest, and *stikos*, order, from the row of leafets at the top.]

aure′um, (fork fern, Ju. ♃.) frond pinnate; leafets stiped, lance oblong, entire, acuminate, the upper ones bearing fruit. Very large, 4 or 5 feet high.

ACTÆ′A. 12—1. (*Ranunculaceæ.*) [From *Acteon*, the hunter.]

america′na, (bane berry, w. ♃.) leaves twice and thrice ternate; racemes ovate; petals shorter than the stamens; berries ovate-oblong. Var. *alba* (red cohosh), petals truncate; pedicels of the fruit thicker than the peduncle; berries white. Var. *ru′bra*, petals acute, pedicels of the fruit slender, berries red. 2 f.

racemo′sa, leaves ternately decompound, leafets ovate oblong, 2 to 4 inches long, nearly smooth, often 3-lobed; racemes compound, terminal, 6 to 12 inches long; many-flowered, petals minute; carpels dry, opening with 2 valves.

ACTINOME′RIS 17—3. (*Corymbiferæ.*) [From *aktin*, a ray, *meris*, part.]

helianthoi′des, (y.) leaves lanceolate, acute, serrate, white-villose beneath; corymb simple, compact; stem winged. *S.*

squarro′sa, (w. y. Au. ♃.) stem-winged, corymbose-paniculate; leaves lanceolate, acuminate at each end, serrate, roughish-pubescent; disk sub-globose, at length squarrose. 3 f.

ADIAN″TUM. 21—1. (*Filices.*) [From *a*, not, and *diaino*, to grow wet, because its leaves are not easily wet.]

peda′tum, (maiden hair, J. ♃.) frond pedate, with pinnate branches; leafets halved, upper margin gashed, barren segments toothed, fertile ones entire; stipe capillary, very glabrous. Woods, 1 f.

ADLU′MIA. 16—5. (*Fumariaceæ.*) [In honor of John Adlum, a distinguished cultivator of this vine.]

cirrho′sa, (climbing colic-weed, y. w. J. ♂.) stem climbing; leaves cirrous; racemes axillary, corymbed, nodding; corolla monopetalous, gibbous both sides of the base. Cultivated.

ADO″NIS. 12—12. (*Ranunculaceæ.*) [Said to have been consecrated by Venus to the memory of the beautiful Adonis.]

autumna′lis, (pheasant's eye, Au. ☉.) flowers 5 to 8-petalled; fruit cylindric; petals emarginate. Ex.

ADOX″A. 8—4. (*Saxifragæ.*) [From the Greek *a*, without, and *doxa*, glory.]

moschatelli′na, (g.) peduncles 4-flowered filaments united at the base in pairs; anthers round. *S.*

ÆSCHYNOM′ENE. 16—10. (*Leguminosæ.*)

his″pida, (false sensitive plant, y-r. Ju. ☉.) stem herbaceous, erect; petioles and peduncles hispid; leaves in many pairs, leafets linear, obtuse; racemes simple, 3 to 5-flowered; legumes with 6 to 9 hispid joints. Marshes. Penn. to Car.

viscid″ula, (y. ♃.) stem procumbent, viscid, slender; leafets 7 to 9-obovate; peduncles about 2-flowered; legume hairy; joints deeply notched. Sandy grounds. 3 f. *S.*

Æ′SCULUS. 7—1. (*Hyppocastaneæ.*) [From the Latin *esca*, food.]

hippocas″tanum, (horse chestnut, w. J ♄.) leaves digitate, with about 7 divisions corolla 5-petalled, spreading; flowers in a panicled pyramid. 15 f. Ex.

glabra, (buck-eye, y-w. May. ♄.) leaves quinate, smooth, leafets ovate-acuminate, corolla 4-petalled, spreading, with the claws as long as the calyx; stamens longer than the corolla; capsules echinate. Woods; a small tree with flowers in panicled racemes. Penn. to Miss.

macrosta′chya, (Ap. ♄.) leaves in 5 divisions, downy beneath; raceme very long, corolla 4-petalled, expanding; stamens long. Beautiful shrub. 6 f. By some called *pa′via*, and considered a separate genus.

ÆTHU′SA. 5—2. (*Umbelliferæ.*) [A Greek word signifying beggarly.]

divarica′ta, (w. ☉.) stem erect, slender; leaves biternate, segments narrow-linear; umbels terminal, without involucres, partial umbels, 3 to 5-flowered; fruit hispid.

cyna′pium, leaves bi- and tripinnate, dark green; segments ovate, lanceolate; umbels terminal. Road-sides. Flowers white, in many-rayed umbels; very poisonous. 1 f. Fool's parsley.

AGARI′CUS. 21—6. (*Fungi.*) [The name is said to have been given in consequence of the resemblance of the plant to a mineral called Agaricus, which is soft and spongy in its texture.]

campes″tris, pileus fleshy, flattish, having dark yellow scales; lamella becoming yellowish red; stipe short; the ring-volva rather incomplete. This is the common eatable mushroom.

AGA′VE. 6—1. (*Bromeliæ.*) [From a Greek word, signifying beautiful.]

virgin″ica, (y-g. ♃ *S.*) stemless, herbaceous; leaves with cartilaginous serratures; scape simple; flowers sessile. Scape 6. f. Flowers fragrant. Rocky banks. Penn. to Car. False aloe.]

AGER″ATUM. 17—1. (*Heliantheæ.*) [From the Greek *a*, without, *geras*, old age, because it never changes color.]

mexica′num, (b. J. ☉) hispid; leaves cordate, ovate, crenate, rugose; corymb compound; chaffs of the egret lanceolate awned. *Cultivated.* Mexico.

AGRIMO′NIA. 11—2. (*Rosaceæ.*) [From *agros*, a field, *monos*, alone.]

eupato′ria, (agrimony, y. Ju. ♃.) cauline leaves interruptedly pinnate, the terminal leafet petioled, leafets obovate, gash toothed, almost glabrous; flowers sub-sessile; petals nearly twice as long as the calyx; fruit hispid. 2 f.

suaveo′lens, (y. Ju. ♃.) stem very hispid; leaves interruptedly pinnate, leafets numerous, lanceolate, acutely toothed, scabrous above, and pubescent beneath fruit turbinate, smooth at the base. 5 f.

parviflo′ra, (dotted agrimony, y. Ju. ♃.)

hairy, leaves interruptedly pinnate, with the terminal ones sessile, leafets numerous, mostly linear-lanceolate, incisely serrate; spike virgate; flowers on very short pedicels; petals longer than the calyx; fruit roundish, divaricately hispid.

A′GROSTEM″MA. 10—5. (*Caryophylleæ.*) [From the Greek *agros*, field, *stemma*, garland.]

githa′go, (cockle, r. J. ☉.) hirsute; calyx longer than the corolla; petals entire.

corona′ria, (Au. ♂.) tomentose; leaves lance-ovate; petals emarginate. Rose campion. Ex.

AGROS″TIS. 3—2. (*Gramineæ.*) [From *agros*, field.]

stric″ta, (bentgrass, J. ♃.) panicle elongated, straight; glumes equal; paleas smaller than the glumes, unequal, with an awn at the base of the outer one longer than the flower.

lat′eriflo′ra, (Au. ♃.) culm erect, branched above, sending off shoots at the base; panicle lateral and terminal, dense; glumes acuminate; paleas longer than the glumes, equal, hairy at the base, awnless; root creeping; leaves broad, with scabrous margins and compressed sheaths. 2 f. Var. *filifor″mis*, a very slender panicle, and the paleas nearly equalling the glume. Sometimes the culm is sub-decumbent. Swamps.

vulga′ris, (red-top, J. ♃.) panicle with smoothish branches, spreading in maturity; outer valve of the corolla 3-nerved; stipule short, truncate. 18 i.

al″ba, (white-top, bonnet grass, J. ♃.) panicle with hispid, spreading, lax branches, outer valve of the corolla 5-nerved, stipule oblong. 18 i. Var. *decum″bens*, stem decumbent. This variety is considered as a distinct species by some, and called *stolonif′era.*

AI′RA. 3—2. (*Gramineæ.*) [From the Greek, a deadly instrument.]

flexuo′sa, (hair-grass, J. ♃.) panicle spreading, trichotomous; branches flexuous; glumes a little shorter than the florets, and about the length of the awn; leaves setaceous; culm nearly naked. 20 i.

a′quat″ica, (water hair-grass, M. ♃.) panicles spreading, half whorled; flowers beardless, obtuse, smooth, longer than the glumes; leaves flat; culm creeping. Water.

AJU″GA. 13—1. (*Labiatæ.*) [From *a*, without, *zugon*, yoke, not paired.]

chamæpi′thys, (y. J. ☉.) leaves 3-cleft; flowers axillary, solitary, shorter than the leaves; stem diffused.

ALCHEMIL″LA. 4—1. (*Rosaceæ.*) [A plant formerly in repute among the alchymists.]

alpi′na, (A. w. ♃.) leaves digitate, serrate, white, soft beneath. Ladies' mantle. High mountains. Ver. N. Hamp.

ALE′TRIS 6—1. (*Asphodeli.*) [From a Greek word signifying meal, from a substance contained in the corolla.]

farino′sa, (Ju. y. ♃.) leaves radical, broad-lanceolate, smooth; flowers pedicelled, oblong-tubular; the perianth when decaying nearly smooth Sandy woods. N. Eng. to Car. White flowers in a longitudinal spike. Root very bitter. Star-grass, colic-root.

aure′a, (Aug. ♃.) flowers yellow, sub-sessile, sub-campanulate. N. J. to Car.

ALIS″MA. 6—13. (*Junci.*) [From the Greek *als*, the sea.]

planta′go, (water plantain, w. Ju. ♃.) leaves ovate-cordate, acute or obtuse, 5 to 9-nerved; flowers in a compound, verticillate panicle; fruit obtusely triangular. Var. *parviflo′ra*, flowers very small; leaves oval, 5 to 7-nerved, acuminate.

ALLIO′NIA. 4—1. (*Jasmineæ.*) [Named in honor of an Italian botanist.]

al″bida, (Ap.) leaves opposite, somewhat scabrous, lance-oblong; involucrum 5-cleft; corolla longer than the involucrum.

nyctagyn″ia (Ju. ♃.) stem erect; leaves broad-cordate, glabrous, acute; peduncles solitary.

AL″LIUM. 6—1. (*Asphodeli.*) [From *aleo*, to smell.]

ce′pa, (garden onion, Ju. ♃.) scape naked, swelling toward the base, longer than the terrete leaves.

schœnopra′sum. (cives, Ju. ♃.) scape naked, equalling the leaves, which are terete-filiform. Ex.

vinea′le, (field garlic p. J. ♃.) stem slender, a little leafy; cauline leaves rounded, fistulous; umbelliferous umbels bearing bulbs; stamens alternately tri-cuspidate. Rose-colored. Introduced from N. Scotia.

canaden″se, scape naked, terete; leaves linear; head bulbiferous. Meadows. Flowers numerous, rose-colored. Can. to Vir.

sati′vum, (garlic, Ju. ♃.) stem flat-leaved, bulb-bearing; bulb compound; stamens tri-cuspidate.

AL″NUS. 19—4. (*Amentaceæ.*) [From *alne*, Italian for alder.]

serrula′ta, (alder. r-g. Ap. ♄.) leaves obovate, acuminate; veins and their axils hairy beneath; stipules oval, obtuse. 9 f.

glutino′sa, (Ap. ♄.) leaves round-wedge form, obtuse, glutinous, axils of the veins downy.

glau′ca, (Mar. ♄.) leaves oblong, acute, doubly serrate, glaucous beneath, axils of the veins naked; stipules naked. Black alder.

ALOPECU′RUS. 3—2. (*Gramineæ.*) [From *alopex*, a fox, and *aura*, a tail.]

praten″sis, (meadow grass, foxtail, J. ♃.) culm erect, smooth; spike cylindric; paleas as long as the glumes.

AL″THÆA. 15—12. (*Malvaceæ.*) [From *ai theo*, to heal.]

officina′lis, (marsh mallows, r. y. Ju. ♃.) leaves downy, oblong-ovate; obsoletely 3-lobed, toothed. Flowers large, purple, near salt marshes. 2 f.

rose′a, (hollyhock, ♂.) stem erect; leaves rough, heart-form, 5 to 7-angled, crenate Ex.

ficifo′lia, (fig-hollyhock, ♂.) leaves 7 lobed, sub-palmate, obtuse. Ex.

ALYS″SUM. 14—1. (*Cruciferæ.*) [From the

Greek *alluso*, mad; this plant being formerly supposed to be a cure for the bite of a mad dog.]

hyperbo'reum, stem herbaceous; leaves hoary, toothed; stamens 4, 2-forked.

saxati'le, (y. ♄. gold basket.) Flowers in panicles; leaves lanceolate, soft, retuse. Ex.

AMARAN''THUS. 19—5. (*Amaranthi.*) [Signifying not withering.]

hy'bridus, (Ju. ☉.) racemes pentandrous, doubly compound, heaped together, erect; leaves ovate-lanceolate.

hypochondria'cus, (spleen amaranth, Au. ☉.) racemes pentandrous, compound, compact, erect; leaves oblong-lanceolate, mucronate, red. False prince's feather. Cultivated.

spino'sus, (Au. ☉.) racemes pentandrous, terminal, compound; axils spinose.

albus, (white coxcomb, g-w. Ju. ☉.) glomerules axillary, triandrous; leaves obovate, retuse; stem 4-cornered, simple. Common garden weed.

melanchol''icus, (love lies bleeding, r. ☉.) glomerules axillary, peduncled, roundish; leaves lance-ovate, colored. Ex.

tri-color, glomerules sessile; leaves lance-oblong, colored. Ex.

livid''us, glomerules triandrous, sub-spiked, roundish; leaves oval, retuse; stem erect. Ex.

AMARYL''LIS. 6—1. (*Narcissi.*)

atamas''co, (atamasco lily, w. and r. J. ♃.) spatha 2-cleft, acute; flower pedicelled; corolla bell-form, sub-equal, erect; stamens declined. *S*,

formosis''sima, (jacobea. ♃.) spatha 1-flowered; corolla ringent-like; petals declined. Ex.

undula'ta, (waved lily, Sept.) The flowers numerous on each stalk; petals pink, undulate. Ex.

AMBRO'SIA. 19—4. (*Urticea.*) [The name *ambrosia*, food for the gods, seems strangely misapplied to a genus of plants possessing neither beauty nor valuable properties.]

ela'tior, (hog-weed, S. ☉.) leaves doubly pinnatifid, smoothish; petioles long, ciliated; racemes terminal, panicled; stem wand-like.

tri'fida, (g. y. ☉. S.) hirsute, rough; leaves very large, 3-lobed, serrate, the lobes oval-lanceolate, acuminate; fruit 6-spined below the summit; flowers in terminal panicles composed of long axillary spikes. 5 to 8 f.

artemisifo'lia, (☉.) leaves doubly-pinnatifid, hoary beneath, at the summit pinnatifid; racemes terminal in threes, branches level-topped.

panicula'ta, (☉.) leaves glabrous, doubly pinnatifid, pinnatifid at the summit; racemes terminal, solitary; branches level-topped.

his''pida, (w. ☉.) white hispid on all parts; leaves 2-pinnatifid, divisions gashed; racemes sub-panicled, terminal. 1 f. *S*.

AMMANN''IA. 4—1. (*Salicarlæ.*) [From Ammann, a Russian botanist.]

ramos''ior, (w-p. Au.) stem erect, thick, sub-terete; leaves lanceolate, dilated at the base; lower flowers completely whorled. Salt meadows. 6 i.

hu'milis, (w-r. Au. ☉. ♂.) stem procumbent at the base, branched, slender, quadrangular; leaves lanceolate, slender at the base; flowers solitary. Stem red. 6 i

AMMO'BIUM. 17—1. (*Cichoraceæ.*) [From the Greek *ammos*, sand, *bio*, to live, found growing in sand.]

ala'tum, (w. ♃.) stem-winged, leaves oblong, undulate, decurrent. Cultivated, brought from N. Holland.

AMOR''PHA. 16—10. (*Leguminosæ.*) [From the Greek *a*, wanting, *morphe*, shape.]

frutico'sa, (Ju. ♄.) smooth, sub-arborescent; leaves petioled, emarginate; spikes aggregated, long; calyx hoary, pedicelled, one of the teeth acuminate, the rest obtuse; legume few-seeded. N. J. to Car. and W. to Rocky Mountains. A shrub with spikes of purple flowers.

pubes'cens, (w. J. ♄., small, shrubby leaves on very short petioles, obtuse at each end, hairy; spikes long, panicled, hairy; calyx sub-sessile, with acuminate teeth. 3 f.

carolinia'na, (broom, ♄. Ju. b.) nearly glabrous; leafets elliptical or oblong, petiolate, dotted, the lowest pair approximate to the stem; flowers on very short pedicels; calyx villose on the margin, teeth short, the two upper obtuse, the three lower longer, and commonly equal, acuminate, or subulate, aristate. 4 to 5 f.

AMPELOP''SIS. 5—1. (*Vites.*) [From the Greek *ampelosa*, vine, and *ops*, resembling.]

quinquefo'lia,* (g. Ju. ♃.) stem climbing and rooting; leaves quinate, digitate, smooth, leafets petiolate, oblong, acuminate, toothed; racemes dichotomous. Var. *hirsuta*, leaves pubescent on both sides, leafets ovate, coarsely toothed.

corda'ta, (Ju. ♄.) stem climbing, with slender branches; leaves cordate, acuminate, toothed, and angular; nerves beneath pubescent; racemes dichotomous, few-flowered; panicles opposite the leaves Banks of streams.

bipinna'ta, leaves doubly pinnate; lance ovate, deeply toothed and lobed. Flowers in corymbs. Southern.

AMPHICAR''PA. 16—10. (*Leguminosæ.*) [From the Greek *amphi*, about, *karpos*, the fruit.]

mono'ica, (wild bean-vine, b. and w. Ju. ☉.) stem slender, twining, hairy backward; leaves ternate, ovate, nearly smooth; stipules ovate, striate. Var. *comosa* has hirsute leaves. Twining. 4 f

AMSO'NIA. 18—5. (*Apocyneæ.*,

latifo'lia, (b. Ap. ♃.) stem glabrous, leaves lance-oval, upper ones acuminate, pubescent on the under surface of the nerves. 2 f. *S*.

salicifo'lia, (b. M.) stem smooth; leaves lance-linear, acute at each end, very glabrous. *S*.

augustifo'lia, (b. Ap.) stem hairy; leaves narrow-linear, numerous, erect, hairy *S* 2 f.

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* Cissus hederacea of Mirbel.

AMYG″DALUS 11—1. (*Rosaceæ.*) [Derived from a Greek word, which signifies to lacerate, alluding to the furrows upon the pericarp of the almond.)

per″sica, (peach, r. M. ♄.) serratures of the leaves all acute; flowers sessile, solitary. 15 f. Ex.

na′na, (flowering almond, ♄.) leaves ovate, tapering to the base, sharply serrate. 3 f. Ex.

commu′nis, (almond) leaves serrate, the lower ones glandular; flowers sessile, binate. Ex.

AMY′RIS. 8—1. (*Terebintaceæ.*) [From the Greek, signifying balm or ointment, so called from its use, or smell. Ex.]

florida′na, (w. ♄.) leaves ovate, sessile, entire, obtuse; flower sub panicled.

gileaden″sis, (balm of Gilead,) leaves ternate, entire; peduncles 1-flowered. Grows near the Red sea.

ANAGAL″LIS. 5—1. (*Jasmineæ.*) [From a Greek word, signifying to laugh, because by curing diseases it was thought to promote cheerfulness.]

arven″sis (red chick-weed, scarlet pimpernel, r. J. ⊙.), stem spreading, naked, procumbent; petals entire, flat, with hairs at the margin. *S.*

ANCHU′SA. 5—1. (*Boragineæ.*) [Greek, *to strangle.*]

officina′lis, (bugloss, y. ♃.) leaves lanceolate; spikes imbricate, one-sided; bracts ovate. Ex.

ANDROCE′RA. 5—1. (*Solaneæ.*) [From *andros* stamen, *keros* a horn, from the coniform appearance of one of the anthers.]

loba′ta, (J. ⊙.) prickly, hirsute; leaves in pairs, lobe-pinnatifid, segments obtuse, obsoletely crenate, undulated; racemes lateral, many-flowered. *S.*

ANDROM″EDA. 10—1. (*Ericæ.*)

calycula′ta, (leather-leaf, w. M. ♄.) leaves lanceolate-oblong, obsoletely serrulate, subrevolute, with scaly dots, rust-colored beneath; racemes terminal, leafy, turned one way; pedicels short, solitary, axillary; calyx acute, 2-bracted at the base, bracts broad-ovate, acuminate; corolla oblong-cylindric. Wet. 2 f.

arbo′rea, (w. Ju. ♄.) leaves oblong-oval, acuminate-serrate, smooth; panicles terminal, many-spiked; corolla ovate-oblong, pubescent. Mountains. A beautiful tree. 50 f. Sorrel-tree.

marian″a, (J. ♄.) leaves oval, entire, subacute at both ends, glabrous, leathery, paler beneath; flower-bearing branches almost leafless; peduncles fascicled; corolla ovate-cylindric; calyx leafy; anthers beardless; capsule ovate, resembling the form of a pine-apple. One variety has narrow-lanceolate leaves.

polifo′lia, (wild rosemary, r-w. M. ♄.) leaves linear-lanceolate, convex revolute, white, glaucous beneath and hoary-glaucous above; flowers aggregate, terminal; corolla sub-globose; anthers bearded toward the top. 1 f. Wet.

panicula′ta, (white bush, pepper bush, w. J. ♄.) pubescent; leaves obovate-lanceolate, acute, sub-entire; flower-bearing branches terminal, panicled, nakedish; glomerules peduncled; corolla sub-globular, pubescent; anthers obtuse, beardless. A shrub running into several varieties. Flowers small.

angustifo′lia, (A.) leaves linear-lanceolate acute, with scaly dots; bracts 2 and minute, acute; racemes terminal, leafy, secund; peduncles solitary, axillary. *S.*

rhomboid″alis, flower-bearing branches 3-angled; leaves rhomboid and lanceolate entire, glabrous, terminated by a gland peduncles clustered, axillary. *S.*

axilla′ris, (w. Mar. ♄.) leaves oval-lanceolate, acuminate, coriaceous, lucid, with spiny serratures; racemes axillary, closely flowered; corolla oblong-ovate; anthers at the summits 2-horned. 3 f. *S.*

ANDROP″OGON. 3—2. (*Gramineæ.*) [From *andros,* a man, and *pogon,* a beard, from the resemblance of little tufts of hair on the flower to a man's beard.]

scopa′rius, (broom-grass, Au. ♃.) spikes simple, lateral, and terminal, pedunculate, in pairs; rachis hairy; abortive floret neuter; valves awned.

virgin″icus, (bent grass, ♃.) culm compressed; superior leaves and sheaths smooth; spikes short, 2 or 3 from each sheath, partly concealed at the base; rachis sub-terete; abortive flower, a mere pedicel without valves; perfect flowers monandrous.

fusca′tus, (fork spike, Au. ♃.) spikes digitate, generally by fours; abortive flower staminiferous, awnless, resembling the perfect one, the awn of which is sub-contorted.

nu′tans, (beard-grass, Au. ♃.) panicle oblong, branched; nodding spikelets by pairs; glumes hairy; awn contorted.

ANDROSA′CE. 5—1. (*Primulaceæ.*) [From *anex,* a man, and *sakos,* a shield, so called from its large, round, hollow leaf.]

occidental″is, (⊙.) very slenderly pubescent; leaves (or involucres) oblong-spatulate, entire; perianths angled; capsule shorter than the calyx. S.

carina′ta, (w. J. ♃.) leaves crowded, lanceovate, acute, entire, keeled, margin ciliate; umbels few-flowered; leaflets of the involucre linear-oblong; corolla exceeding the ovate calyx; divisions obovate, entire. James' Peak. *S.*

septentrional″is, (⊙.) leaves lanceolate, toothed, glabrous, shining; perianth angled, shorter than the corolla. *S.*

ANEM″ONE. 12—12. (*Ranunculaceæ.*) [From *anemos,* the wind, so called because the petals expand through the influence of the wind blowing upon the flower.]

virginia′na. (wind-flower, g-w. Ju. ♃.) stem dichotomous; leaves in threes, 3-cleft, upper ones opposite, leafets gash-lobate and serrate, acute; peduncles solitary 1-flowered, elongated; seed oblong, woolly mucronate, in heads. 18 i.

nemoro′sa, (low anemone r-w. M. ♃.) stem 1-flowered; cauline leaves in threes, 5-parted, leafets wedge-form, gash-lobed, toothed, acute; corolla 5 to 6 petalled; seeds ovate, with a short style, hooked. A vari ety, *quinquefo'lia*, has lateral leafets, deeply 2-cleft. 6 i. *S.*

thalictroi'des, (rue anemone, w. M. ♃.) umbels involucred; radical leaves twice ternate, leafets sub-cordate, 3-toothed; involucrum 6-leaved; leafets petioled, uniform; umbel few-flowered; seed naked, striate; root tuberous. A variety, *uniflo'ra*, has a 1-flowered involucrum. 5 i. *S.*

pennsylva'nica, (w. Ju. ♃.) leaves 3-parted, segments 3-cleft, lobes oblong, toothed, acuminate; involucrum sessile, bearing several pedicels, one naked and 1-flowered, the others involucellate; petals 5; fruit pubescent, crowned with a long style. Meadows. Flowers large. Considered the same as A. dichotoma.

horten''sia, (garden anemone,) radical leaves digitate, divisions 3-cleft, cauline ones ternate, lanceolate, connate, sub-divided; seed woolly. Ex.

ANE'THUM. 5—2. (*Umbelliferæ.*) [From the Greek *aneu*, to run, *theo*, afar, alluding to the spreading roots. Ex.]

graveo'lens, (dill,) fruit compressed; plant annual.

fœnic''ulum, (fennel,) fruit ovate; plant perennial.

ANGEL''ICA. 5—2. (*Umbelliferæ.*) [*Angelic*, on account of its supposed virtues.]

atropurpu'rea, (angelica, g-w. J. ♃.) stem smooth, colored; leaves ternate, partitions sub-quinate, leafets ovate, acute, gash-serrate, sub-lobed, 3 terminal ones confluent; petioles very large, inflated. Wet meadows. Root purplish. Aromatic angelica. 4 f.

triquina'ta, (w. Au. ♃.) stem terete, pubescent above; leaves ternate, very smooth, partitions quinate, leafets oblong; ovate, equally serrate, lower ones 2-lobed at the base. 4 f.

archangel''ica, (archangel, ♂.) leaves unequally lobed. A native of Lapland. Medicinal.

ANNO'NA. 12—12. (*Annonæ.*)

gla'bra, (Ju. r-y. ♄.) calyx large, bell form; peduncles 2-flowered, opposite the leaves; leaves lance-ovate, glabrous; fruit subconic, obtuse, smooth. 16 f. Evergreen tree. Carolina.

AN''THEMIS. 17—2. (*Corymbiferæ.*) [From the Greek *anthos*, a flower.]

cot''ula, (may-weed, w. J. ⊙.) receptacle conic; chaff bristly; seed naked; leaves 2-pinnate, leafets subulate, 3-parted. 10 i.

no'bilis, (chamomile, w. Au. ♃.) leaves 2-pinnate; leafets 3-parted, linear, subulate, sub-villous; stem branching at the base. Fragrant. 4 i. Ex.

arven''sis, (wild chamomile, w-y. J. ♂.) leaves bipinnate, segments lanceolate, linear; receptacle conic; chaff lanceolate, akenes crowned with a margin.

AN''THOXAN''THUM. 2—2. (*Gramineæ.*) [From the Greek *anthos*, a flower, *xanthos*, yellow.]

odora'tum, (sweet vernal grass, M. ♃.) spike oblong-ovate; florets sub-peduncled, shorter than the awn. An American variety, *altis''simum*, is larger and of a dark green. An elegant substitute for the Leghorn grass. 10-18 i.

ANTIRRHI'NUM. 13—2. (*Bignoniæ.*) [From *anti*, against, *ris*, nose, said to be so named from an unpleasant odor in some of its species.]

canaden''se, (flax snap-dragon, w-b. Ju ⊙.) rising in a curve, glabrous, simple leaves scattered irregularly, erect, narrow linear, obtuse, remote; flowers racemed scions procumbent. Flowers small.

lina'ria, (snap-dragon, y. Ju. ♃.) erect, glabrous; leaves scattered, lanceolate-linear, crowded together; spikes terminal, dense-flowered; calyx glabrous, shorter than the spur. Flowers large. Toad-flax. Naturalized. 12-18 i.

elat''ine, (y. Ju. ⊙.) procumbent, hairy; leaves alternate, hastate, entire; peduncles solitary, axillary, very long. Flowers small, bluish white. Introduced.

trianthop''orum, leaves whorled, lanceolate, 3-parted; stem decumbent; racemes terminal, few-flowered. Flowers large. Ex.

ANY'CHIA. 5—1. (*Amaran'ti.*)

dichot''oma, (fork chickweed, w. Ju. ♃.) stem dichotomous, very branching, spread; leaves oval, lanceolate, glabrous, erect; 6 or 8 inches high, very slender; branches axillary; leaves obtusish; flowers mostly longer than the stipules.

APAR''GIA. 17—1. (*Cichoraceæ.*) [A Greek word, signifying succory.]

autumna'lis, (false hawk-weed, y. J. ♃.) scape branching; peduncles scaly; leaves lanceolate, toothed, or pinnatifid, smoothish. Flowers bright yellow, resembling the dandelion. Fields and road-sides. Introduced.

oron''tium, (Ju. ⊙.) erect, branching, hairy; leaves alternate, lanceolate; flowers sub-spiked; involucre digitate, longer than the corolla. *S.*

tenel''lum, (b. Ju. ⊙.) small, simple, glabrous; leaves opposite, linear, acute; flowers axillary, short-peduncled; involucre bell-form. *S.*

APHA'NES. 4—2. (*Rosaceæ.*) [From a Greek word, signifying low in stature.]

arven''sis, (parsley-piert, ⊙.) leaves 3-parted; divisions 3-cleft, hairy; flowers axillary, glomerate, monandrous. *S.*

A'PIOS. 16—10. (*Leguminosæ.*) [From the Greek *apios*, mild, in allusion to the root.]

tubero'sa, (ground-nut, dark p. Ju. ♂.) stem twining; leaves pinnate, with 7 lance-ovate leafets; racemes shorter than the leaves; root tuberous, farinaceous, in taste resembling the cocoa-nut, and highly nutricious. Ex.

A'PIUM. 5—2. (*Umbelliferæ.*) [Supposed to be derived from the Greek *apes*, bees, because they are fond of the plant.]

petroseli'num, (parsley, Ju. ♂.) cauline leaves linear; involucrum minute. Ex.

graveo'lens, (celery, Ju. ♂.) stem channelled; cauline leaves wedge-form. Ex.

APLEC''TRUM. 18—1. (*Orchideæ.*) [From *a*, without, *plectron*, spur.]

hiema'lis, (g-p. M. ♃.) leaf solitary, ovate, striate; lip trifid, obtuse, with the palate ridged, central lobe rounded, crenulate. Shady woods. Flowers pendulous. 1 f.

APO'GON. 17—1. (*Cichoraceæ.*) [From *a*, without, *pogon*, beard.]

humil″is, (y. Ap. ☉.) stem glabrous; radical leaves sessile, cauline leaves, ligulate, acute, leaves entire, glabrous.

APOC″YNUM. 18—5. (*Apocyneæ.*) [From *apo*, against, and *kunos*, a dog.]

androsæmifo'lium, (dog-bane, r-w. J. ♃.) stem erect and branching; leaves ovate; cymes lateral and terminal; tube of the corolla longer than the calyx, with a spreading limb. 3 f.

cannab″inum, (g-y. J. ♃.) leaves lanceolate, acute at each end, smooth on both sides; cymes paniculate; calyx as long as the tube of the corolla.

APTE'RIA. 3—1. (*Junci.*) [From the Greek *a*, without, *pteris*, wings.]

seta'cea, (w. and p. ☉.) stem with minute, ovate, remote scales; spikes with bifid branches. 6 i. *S.*

AQUILE'GIA. 12—5. (*Ranunculaceæ.*) [From the Latin *aqua*, water, and *ago*, to gather, so called from the shape of its leaves, which retain water.]

canaden″sis, (wild columbine, r. y. Ap. ♃.) horns straight; stamens exsert; leaves decompound. Growing frequently in crevices of rocks. 15 i.

cæru'lia, (b. J. ♃.) horns twice as long as the petals; nectaries acute; segments of the leaves deeply lobed. 18-1. Southern.

vulga'ris, (garden columbine, J. ♃.) horns incurved; leafy; stem and leaves glabrous; leaves decompound. The nectariferous horns become numerous by culture; one hollow horn within another. 15 i. Ex.

brevisty'la, sub-pubescent; spur incurved, shorter than the limb; stipe short, inclined; stamens shorter than the corolla. Upper Canada.

formo'sa, (♃. r.) spur straight, much longer than the limb; sepals lanceolate, acute, 3 times the length of the petals; style as long as the sepals. Oregon.

AR″ABIS. 14—2. (*Cruciferæ.*) [Probably named in Arabia.]

lyra'ta, (w. A. ♂.) stem and upper leaves smooth and glaucous; radical leaves lyrate-pinnatifid, often pilose; stem branched at the base; pedicels much longer than the calyx. 10 i.

canaden'sis, (w. J. ♃.) stem leaves sessile, oblong-lanceolate, narrow at the base, pubescent; pedicels pubescent, reflexed in the fruit; siliques pendulous, sub-falcate, nerved. 2 f.

rhombo'idea, (spring cress, w. M. ♃.) leaves glabrous, rhomboidal, repand-toothed, the lower ones nearly round, on long petioles; root tuberous. 15 i. Wet.

denta'ta, (☉. w. Ap.) stellately pubescent; radical leaves obovate, tapering at the base into a petiole, as long as the limb, irregularly sharp toothed; cauline ones, oblong, clasping; flowers minute; petals spatulate, scarcely longer than the calyx; silique short, spreading on very narrow pedicels, pointed with a nearly sessile stigma; stem branched from the base Arkansas. Mississippi.

sagitta'ta, (wall-cress, w. J. ☉. ♂.) leaves sub-dentate, rough, with the pubescens often branched; radical ones ovate or oblong, attenuated into a petiole; stem leaves lanceolate, sagittate, cordate; pedicels as long as the calyx; siliques straight and erect. 18 i.

ARA'CHIS. 16—10 (*Leguminoseæ.*) [A Greek word, signifying a rooting plant.]

hypogæ'a, (pea-nut, false ground-nut, ☉.) stem procumbent, pilose; leaves pinnate, flowers axillary; peduncles become long, and the fruit is ripened under ground.

ARA'LIA. 5—5. (*Araliæ.*) [From *ara*, a bank in the sea, in allusion to the habit of the plant.]

racemo'sa, (spikenard, w. J. ♃.) spreading branches; petioles 3-parted, the partitions 3-5-leaved; leafets often heart-form; branchlets axillary, leafy; umbels many, sub-panicled, leafless above. Damp. 4 f.

nudicau'lis, (g-w. J. ♃.) stem hardly a caulis; leaf solitary, terquinate; scape shorter than the leaf; umbels few. Wild sarsaparilla. 15 i. *S.*

spino'sa (shot-bush, angelica tree, w. y w. Au. ♄.) stem and leaves thorny; leaves doubly pinnate; leafets slightly serrate; panicles branching; umbels numerous.

ARBU'TUS. 10—1. (*Ericæ.*)

uva-ur″si, (bear-berry, kinnikinnick, w-r M. ♄.) stem procumbent; leaves wedge-obovate, entire; berry 5-seeded. Dry, barren sand-plains, &c. Very abundant about the great lakes.

alpi'na, (strawberry-tree, w. M. ♄.) stem procumbent; leaves obovate, acute, rugose, serrate; racemes terminal. Canada.

ARCHEMO'RA. 5—2. (*Umbelliferæ.*) [From *arche*, the conqueror, *moros*, a fool, from poisoning those who eat it.]

ambig″ua or *rigid″a*, (water drop-wort, w. Au. ♃.) leaves gash-pinnate, 3-5 pairs, acute, leafets lance-linear, often falcate and mostly entire; fruit ovate; stem smooth. 3-5 f.

ARC″TIUM. 17—1. (*Cinarocephalæ.*) [From *arktos*, a bear, so called on account of its roughness.]

lap″pa, (burdock, r. Au. ♃.) cauline leaves heart-form, petioled, toothed; flowers panicled, globose; calyx smooth.

ARENA'RIA. 10—3. (*Caryophylleæ.*) [From *arena*, sand.]

lateriflor″a, (sand-wort, w. J. ♃.) stem filiform, simple; leaves ovate, obtuse, sub-triple-nerved; peduncles lateral, solitary, elongated, 2-cleft; pedicels alternately bracted; corolla longer than the calyx. 6-10 i.

gla'bra, (♃.) very smooth; stems numerous, erect, filiform; leaves subulate, linear flat, spreading; pedicels 1-flowered, elongated, divaricate; sepals ovate, obtuse, shorter than the petals. Mountains. Flowers large, white. Stem 4-6 i. erect, slender.

serpyllifo'lia, (thyme-leaved sand-wort,

w. Ju. ☉.) stem dichotomous, spreading; leaves ovate, acute, subciliate; calyx acute, sub-striate; petals shorter than the calyx. 5 i.

stric''ta, (w. M. ♃.) glabrous, erect, many stems; leaves subulate-linear, erect; panicles few-flowered; petals much longer than the calyx, which is oval-lanceolate, striate. Dry. 6-12 i.

peploi'des, (sea chickweed, Ju. ♃.) glabrous; leaves ovate or oblong, acute, fleshy; flowers sub-solitary, short-peduncled; divisions of the calyx obtuse, exceeding the corolla. 8-12 i. Lower Canada.

pitche'ri (☉.) erect, slender, glabrous, fastigiately branched, few-flowered; leaves linear-filiform, obtuse, not fascicled; peduncles slightly glandular-pubescent; petals oblong, somewhat exceeding the lanceolate, nerved sepals. Texas. Arkansas.

ARETHU'SA. 18—1. (*Orchideæ.*)

bulbo'sa, (arethusa, r. J. ♃.) leafless; root globose; scape sheathed, 1-flowered; calyx with the superior divisions incurved, lips sub-crenulate; flowers large, sweet-scented. Damp.

ARGEMO'NE. 12—1. (*Papaveraceæ.*)

mexicana, (y. Ju. ☉.) leaves pinnatifid, spinose, gashed; flowers axillary. Var. *albiflora*. *S.*

ARIS''TIDA. 3—2. (*Gramineæ.*)

dichot''oma, (beard grass, poverty grass, ♂. ♃.) cespitose; culm dichotomous; flowers racemose-spiked; lateral awns very short, intermediate ones contorted. 8-12 i.

spicifor''mis (♃.) flowers crowded together, somewhat spiked; the middle awn villous at the base. 3 f. *S.*

gra'cilis, (♃.) stem very slender; flowers in spikes; spikelets few-flowered, somewhat remote, appressed; lateral awns short, erect, the intermediate ones longer, expanding. 1 f. *S.*

tuberculo'sa, culm erect, dichotomous, joints tumid with small tubercles in the axils; panicles rigid; glumes keeled, with long subulate points; paleas stiped; awns smooth, convolute. 3 f. *S.*

ARISTOLO'CHIA. 18—6. (*Aristolochiæ.*)

serpenta'ria, (p. J. ♃.) leaves heart-form, oblong, acuminate; stem zigzag, ascending; peduncles radical; lips of the corolla lanceolate. Virginia snake-root. A variety has very long, narrow leaves.

si'pho, (Dutchman's pipe, J. ♄) leaves heart-form, acute; stem twining; peduncles 1-flowered, furnished with an ovate bract; corolla ascending, the border 3-cleft, equal. A vine climbing over large trees. Flowers solitary, brown.

tomento'sa, (g-y.) stem twining; leaves nearly round, cordate, tomentose underneath; corolla villous; border 3-cleft, nearly equal. *S.*

hasta'ta, stem fluxuose, simple, erect; leaves somewhat cordate, hastate, acute; flowers on scapes; lip of the corolla ovate. *S.*

ARMENIA'CA. 11—1. (*Rosaceæ.*) [From Armenia.]

vulga'ris, (apricot, ♄.) leaves sub-cordate; stipules palmate. Var. *pre'cox*, early apricot. Fruit small, yellow. Var. *persicoi'des*, peach apricot. Fruit sub-compressed.

ARNI'CA. 17—2. (*Corymbiferæ.*)

nudicau'lis, (y. J. Ju. ♃.) hirsute; radical leaves opposite, decussate, broad-lanceolate, nerved, and toothed; stem nearly leafless, divided near the summit into a few 1-flowered branches. Flowers large. 2-2 f. Pine barrens. Leopard's bane.

plantagin''ea, (y. Ju. ♃.) glabrous, leaves entire, glabrous both sides, acute, 3-nerved; radical ones lance-spatulate, terminating in a narrow petiole at the base; cauline ones opposite, lanceolate sessile; stem 1-flowered. 7 i.

ful''gens, (y. Ju. ♃.) hairy; radical leaves lanceolate, obtusish, tapering to the base; petioles 3-nerved; cauline leaves opposite, remote, linear; stem 1-flowered. 1 f. *S.*

clay'toni, (y. Ju. ♄.) hirsute; radical leaves decussately opposite, oblong ovate, sub-dentate; stem somewhat leafless; top divided into 1-flowered peduncles. 2 f. *S.*

ARO'NIA. 11—5. (*Rosaceæ.*) [A Greek word, signifying the medlar-tree.]

botrya'pium, (shad-bush, june-berry, w Ap. ♃.) leaves oblong-oval, cuspidate, glabrous when mature, (when first expanded lanceolate and downy); flowers racemed; petals linear; germs pubescent; segments of the calyx glabrous.

arbutifo'lia, (M. ♄.) unarmed; leaves ovate-oblong, acute, serrulate, tomentose beneath; flowers in corymbs; calyx tomentose. Low thickets. 2-4 f. Redchoke-berry.

ova'lis, leaves roundish-elliptical, ovate, smooth; flowers in racemes; petals obovate; germs and segments of the calyx pubescent. Swamps. A small shrub; berries black and eatable. Medlar-bush.

sanguin''ea, (bloody choke-berry, w. M. ♄.) leaves oval, obtuse at both ends, mucronate, serratures very slender; racemes few-flowered; calyx glabrous; petals linear, obtuse. 3-6 f.

alnifo'lia, (♄.) smooth; leaves roundish, upper part toothed, pinnately-nerved, sub-glaucous beneath; raceme simple, elongated. Fruit black and sweet. *S.*

ARTEMI'SIA.* 17—2. (*Corymbiferæ.*) [From an ancient queen.]

pon''tica, (Roman artemisia,) leaves downy beneath, cauline ones bipinnate; leafets linear; branches simple; flowers roundish, peduncled, nodding. Ex.

absinth''ium, (wormwood, ♃.) stem branching, panicled; leaves hoary, radical ones triply pinnatifid, divisions lanceolate, toothed, obtuse; cauline ones 2-pinnatifid or pinnatifid, divisions lanceolate, acutish floral ones undivided, lanceolate. Naturalized in most mountain districts of New England.

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* The cultivated plant often called Artemisia, belongs to the genus Chrysanthemum

abrota'num, (southern-wood, ♃. and ♄.) stem straight; lower leaves bipinnate; upper ones hair-form, pinnate; calyx pubescent, hemispheric. Ex.

canaden''sis, (wild wormwood, w. y. Au. ♃.) sub-decumbent, scarcely pubescent; leaves flat, linear-pinnatifid; branchlets spike-flowered; flowers sub-hemispheric; involucre scarious. Receptacles smooth. 3-4 f.

cauda'ta, (♃.) stem simple, herbaceous, much branched, pyramidal; radical and cauline leaves bipinnate, pubescent; upper ones pinnate, with sub-setaceous, alternate, divaricate, somewhat convex segments; flowers pedicelled, erect, globe-ovate. 2 f.

A'RUM. 19—12. (*Aroideæ.*) [From *jaron*, a Hebrew word, signifying a dart, in allusion to the shape of the leaves.]

triphyl''lum, (Indian turnip, wild turnip, wakerobin, p. g. and w. M. ♃.) sub-caulescent; leaves ternate; leafets ovate, acuminate; spadix club-form; spatha ovate, acuminate, peduncled, with the lamina as long as the spadix. One variety, *vi'rens*, has a green spatha: another, *atropurpu'reum*, a dark purple spatha: another, *al''bum*, a white spatha. 1-3 f.

dracon''tium, (Ju. ♃.) stemless; leaves pedate; leafets lanceolate-oblong, entire; spadix subulate, longer than the oblong, convolute spatha. Banks of streams. Green-dragon.

atroru'bens, (brown dragon, M. ♃.) stemless; leaves ternate; leafets ovate, acuminate; spadix cylindrical; spatha sessile, ovate, acuminate, spreading horizontally above. Spatha dark-brown; disagreeable smell.

quina'tum, (♃.) stemless; leaves quinate, lanceolate, acuminate. *S.*

walte'ri, (Ap.) stemless; leaves sagittate, triangular, angles divaricate, acute. *S.*

ARUN''DO. 3—2. (*Gramineæ.*) [Latin, signifying reed.]

canaden''sis, (Au. ♃.) panicle oblong, loose; glumes scabrous, pubescent, as long as the corolla; corolla awned on the back; hairs at the base equalling the valves; culm and leaves smooth. 3-4 f.

phragmi'tes, (reed-grass, Au. ♃.) spikelets 3 to 5-flowered; glumes shorter than the florets; paleas awnless, the lower linear lanceolate, with a long slender acumination, which is involute and resembles an awn.

aroi'des, (♃.) panicle sub-coarctate, incurved; glumes 2-flowered, glabrous, unequal; paleas membranaceous, of the length of the glumes; hairs equalling the paleas; leaves flat, scabrous. *S.*

AS''ARUM. 18—12. (*Aristolochiæ.*) [From *a*, not, *sairo*, to adorn, this flower not being admitted into the ancient coronal wreaths.]

canaden''se, (white snake-root, wild-ginger, g-p. M. ♃.) leaves broad-reniform, in pairs; calyx woolly, deeply 3-parted; the segments sub-lanceolate, reflexed.

arifo'lium, (Mar. ♃.) leaves sub-hastate, cordate; calyx urceolate, border 3-cleft converging, pubescent within. *S.*

ASCLE'PIAS. 18—5. (*Apocyneæ.*) [Supposed to have been named in honor of the founder of medical science, Æsculapius, or, as he is sometimes called in mythology Asclepois.]

A. *Leaves opposite.*

syri'aca, (common milkweed, w-p. Ju. ♃.) stem very simple; leaves lanceolate-oblong, gradually acute, downy beneath; umbels sub-nodding, downy, 3 to 5 feet high; flowers in large close clusters, sweet-scented. 3-5 f.

incarna'ta, (r. Ju. ♃.) stem erect, branching above, downy; leaves lanceolate, sub-downy both sides; umbels mostly double at their origin; the little horn of the nectary exsert. A variety, *pul''chra*, is more hairy. Var. *gla'bra*, almost glabrous. Var *al''ba*, has white flowers. Damp. 3 f.

obtusifo'lia, (J. ♃.) stem single, erect; leaves clasping, oblong-obtuse, undulate on the margin, very smooth, glands beneath; umbel terminal, long peduncled; horns of the nectary exsert. Stem 3 f. Leaves much waved on the margin. Flowers large, pale purple.

phytolaccoi'des, (Ju. ♃.) stem erect, simple; leaves broad-lanceolate, acuminate, smooth, pale beneath; umbels many-flowered, lateral and terminal, solitary, on long peduncles, nodding; nectary 2-toothed Wet; rocky grounds. Flowers large greenish purple, 3 f.

quadrifo'lia, (w. p-w. M. ♃.) stem erect, simple, glabrous; leaves ovate, acuminate, petioled; those in the middle of the stem are largest, and in fours; umbels 2, terminal, lax-flowered; pedicels filiform 18 i. Flowers small and sweetscented.

amœ'na, (p. J. ♃.) stem simple, a little hairy on two sides; leaves sub-sessile, oblong-oval, pubescent beneath; terminal umbels and nectaries erect, appendages exsert. Damp.

purpuras''cens, (p. Ju. ♃.) stem simple; leaves ovate, villose beneath; umbels erect, horn of the nectaries resupinate. Shades. 2 f.

pul''chra, (r. Ju. ♃.) leaves lanceolate, hairy beneath; stem divided near the top; umbels erect, in pairs; flowers small; bark very showy.

variega'ta, (w. Ju. ♃.) stem simple, erect; leaves ovate, petioled, rugose, naked; umbels sub-sessile, pedicelled, tomentose. The umbels dense.

parviflo'ra, (w. Ju. ♃.) smoothish; stem weak, erect, simple; leaves petioled, oval-lanceolate, acute at both ends, membranaceous; umbels terminal, lax-flowered; pedicels capillary. The bark a good substitute for flax. 1-2 f.

B. *Leaves not opposite.*

verticilla'ta, (dwarf milkweed, g-y. w. Ju. ♃.) stem erect, very simple, marked with lines, and small pubescence, leaves very narrow-linear, straight, glabrous, whorled, scattered, horn in the nectary exsert. 2 f.

tubero'sa, (Ju. ♃.) stem erect, hairy, with spreading branches; nectary without horns; leaves oblong-lanceolate, sessile, alternate, somewhat crowded; umbels numerous, forming terminal corymbs. Sandy fields. Flowers large, bright-orange, in numerous, erect umbels. Medicinal. Pleurisy-root, butterfly-weed.

pauper''cula, (r-g. M. ♃.) leaves linear, lanceolate, very long, remote, glabrous with the margin pubescent; umbels few-flowered. 3-4 f.

conni'vens (J. ♃.) leaves oblong, oval, mucronate, slightly hairy, sessile; leaves of the nectary usually long, incurved, connivent at the summit. 1-2 f. *S.*

tomento'sa, (♃.) leaves oval, lanceolate, acute, tomentose; umbels sessile with the horns exsert. 1-2 f. *S.*

amplexicau'lis, (p. w. Ap. ♃.) very glabrous; stems decumbent; leaves sessile, cordate, strongly veined, glaucous, appressed; umbels terminal and axillary. 1-2 f. *S.*

nive'a, (Ju. ♃.) leaves ovate, lanceolate, nearly glabrous; umbels erect, lateral, solitary; stem simple. *S.*

angustifo'lia, (g. w. M. ♃.) leaves scattered, strap-shaped, slightly pubescent; umbels solitary, terminal; horns included. 8-18 i. *S.*

cine'rea, (J. ♃.) leaves long, linear, opposite; umbels few, terminal, naked; horns short. 3 f. *S.*

ASCY'RUM. 12—3. (*Hypericæ.*) [From *a*, without, *skuros*, roughness.]

crux-andre'æ, (y. Ju. ♄.) stems numerous, subfruticose, terete, with erect branches; leaves ovate-linear, obtuse; inner petals sub-orbicular; pedicels with 2 bracts; flowers sessile; styles 1-2. Sandy fields. N. J. to Car. Flowers solitary, axillary, nearly sessile, pale yellow. This plant varies so much in the size and number of its leaves, and in the number of its styles, that it seems doubtful whether more than one species are not here included. Sand. St. Peter's wort.

amplexicau'le, (Ap. y. ♃.) erect, sparingly branched, with the branches compressed; leaves ovate, oblong, clasping; outer sepals cordate; styles 3 to 4. 1-2 f. *S.*

ASIMI'NA. 12—12. (*Annonæ.*) [From the Greek *asamenos*, sad.]

trilo'ba, (Ap. ♄.) leaves oblong, crenate, acuminate, and with the branches smoothish; flowers on short peduncles; outer petals roundish ovate, 4 times as long as the calyx. Banks of streams. N. Y. to Flor. Flowers solitary, dark brown; fruit large, fleshy, eatable, sweetish. 15-20 f. American papaw tree.

ASPAR''AGUS. 6—1. (*Asparagi.*) [A Greek word, signifying a young shoot.]

officina'lis, (asparagus. Ju. ♃.) stem herbaceous, unarmed, sub-erect, terete; leaves bristle-form, soft; stipules sub-solitary Naturalized. 4 f.

ASPHODE'LUS. 6—1. (*Asphodeli.*) [From the Greek *apodelus*, ashes, because it was formerly planted upon the graves of the dead.]

lu'teus, (asphodel, king's spear. ♃.) stem leafy; leaves 3-sided, striate. Ex.

ramo'sus, stem naked; leaves ensiform carinate, smooth. Ex.

ASPID''IUM. 21—1. (*Filices.*) [From *aspides* round like a shield; shield-form.]

margina'le, (Ju. ♃.) frond doubly-pinnate; lesser leafets oblong, obtuse, decurrent, crenate, more deeply crenate at the base; fruit-dots marginal; stipe chaffy 2-3 f.

ASPLE'NIUM. 21—1. (*Filices.*) [*a*, without, *spleen*, the spleen, being used in the cure of this disease.]

rhizophyl''lum, (walking leaf, Ju. ♃.) frond lanceolate, stiped, sub-crenate, heart-form ears at the base; apex very long, linear-filiform, rooting. Var. *pin''natifi'dum*, leaves with the crenatures so deep as to become sub-pinnatifid.

ebe'num, (ebony spleen-wort, Ju. ♃.) frond pinnate; leafets sessile, lanceolate, serrulate, cordate at the base, auricled above. 6-10 i. Rocks and dry places.

AS''TER. 17—2. (*Corymbiferæ.*) [A Greek word, signifying star.]

A. *Leaves entire.*

ri'gidus, (p. y. Au. ♃.) leaves linear, mucronate, sub-carinate, rigid, margin rough-ciliate; the cauline leaves reflexed, the branch ones spreading, subulate; stem erect, somewhat branched above; branchlets 1-flowered, corymbed; calyx imbricate, twice as short as the disk, scales obtusish, carinate; rays about 10-flowered, reflexed Hardly a foot high.

linariifo'lius, (p. y. Au. ♃.) leaves thick set, nerveless, linear, mucronate, dotted, carinate, rough, stiff, those on the branches recurved; stem sub-decumbent; branches level-topped, 1-flowered; calyx imbricate, of the length of the disk; stem rough, purplish.

multiflo'rus, (w-y Au. to Nov. ♃.) leaves linear, smoothish; stem very branching, diffuse, pubescent; branchlets one way; calyx imbricate; scales oblong, scurvy, acute.

flexuo'sus, (y. w-p. Au. ♃.) very glabrous, leaves subulate, linear, somewhat fleshy, sub-reflexed; stem slender, very branching; branches and branchlets spreading, bristle-form, 1-flowered; scales of the peduncles divaricate, subulate; calyx imbricate, scales close-pressed, acute. Salt marshes.

cornifo'lius, (w. Au. ♃.) glabrous; leaves oblong-ovate, acuminate, short-petioled: margin rough; stem glabrous; panicle few-flowered; branches 2-flowered; calyx sub-imbricate.

amygdali'nus, (w. S. ♃.) leaves lanceolate, tapering to the base, acuminate, margin rough; stem simple level-topped-co corymbed at the top, calyx lax-imbricate; scales lanceolate, obtuse; rays large.

nova-ang'liæ, (b-p. Au. ♃.) leaves linear-lanceolate, pilose, clasping, auricled at the base; stem sub-simple, pilose, straight, and stiff; flowers sub-sessile, terminal, crowded; scales of the calyx lax, colored, lanceolate, longer than the disk. In rich soil it grows 10 feet high. Flowers large.

cya'neus, (b. p. Au. ♃.) leaves linear-lanceolate, clasping, smooth; stem wand-like, panicled, very glabrous; branches racemed; scales of the calyx lax, lanceolate, equalling the disk, inner ones colored at the apex. 3-4 f. Flowers many and large. This is the handsomest of the asters.

tennifo'lius, (w. Au. ♃.) leaves linear-lanceolate, tapering to both ends, margin hispid; stem glabrous, branching, erect; branchlets 1-flowered; involucre imbricate; scales oblong, acute, lax.

hyssopifo'lius, (star-flower, w. y. p. Au. Oc. ♃.) leaves linear-lanceolate, 3-nerved, dotted, acute, margin scabrous; branches fastigiate, clustered; rays about 5-flowered; involucrum imbricate, twice as short as the disk. 1-2 f. Sandy fields and woods.

humil''is, (w. Au. ♃.) leaves sub-rhomboid, oval-lanceolate, acuminate at both ends, sub-petioled, glabrous, margin hispid; corymb divergingly dichotomous, nakedish; few-flowered; involucre lax-imbricate; rays 8-flowered; a foot high. Flowers large.

amygdali'nus, (w. ♃.) leaves lanceolate, tapering to the base, acuminate, margin rough; stem simple, level-top-corymbed; involucre lax-imbricate; scales lanceolate, obtuse; rays large.

ericoi'des, (w-y. Au. ♃.) leaves linear, very glabrous; those of the branchlets subulate, approximate; cauline ones elongated; involucre scurfy; leaves acute; stem glabrous; flowers small.

B. *Leaves more or less cordate and ovate, serrate, or toothed.*

diversifo'lius, (E. y. p. S. ♃) leaves nearly entire, undulate, pubescent, sub-scabrous; lower ones cordate, ovate, with winged petioles; upper ones lance-oblong; panicle loose, the branches slender, racemose. 3 f.

panicula'tus, (b-p. Au. to Nov. ♃.) leaves ovate-lanceolate, sub-serrate, petioled, glabrous; radical ones ovate, heart-form, serrate, rough, petioled; petioles naked; stem very branching, glabrous; branchlets pilose; calyx lax, sub-imbricate. 2-4 f. Flowers smallish, numerous.

cordifo'lius, (w. S. ♃.) leaves heart-form, pilose beneath, sharp-serrate, petioled; petioles winged; stem panicled, smoothish; panicles divaricate; calyx lax, sub-imbricate; flowers small.

corymbo'sus, (w. Au. ♃.) leaves ovate, sharp-serrate, acuminate, smoothish; lower one heart-form, petioled; petioles naked; stem glabrous, level-top-corymbed above; branches pilose; calyx oblong, imbricate, scales obtuse, very close-pressed. 12-14 i Flowers rather large.

undula'tus, (♃.) stem-leaves heart-oblong, clasping, undulate, scabrous, toothed near the summit; branches of the panicle expanding, few-flowered; involucre sub-squarrose; flowers large.

macro'phyl''lus, (w. b. Au. ♃.) leaves ovate, petioled, serrate, rough; upper ones ovate-heart-form, sessile; lower ones heart form, petioled; petioles sub-margined; stem branching, diffused; involucre cylindric, closely imbricate; scales oblong, acute. 1-2 f. Flowers largish

C. *Leaves lanceolate and ovate, lower ones serrate.*

amplexicau'lis, (b. S. ♃.) leaves ovate-oblong, acute, clasping, heart-form, serrate, glabrous; stem panicled, glabrous; branchlets 1-2-flowered; scales of the calyx lanceolate, closely imbricate; flowers middle sized.

versic''olor, (y-w. Au. ♃.) leaves sub-clasping, broad-lanceolate, sub-serrate, glabrous; radical ones serrate in the middle stem very branching, glabrous; scales of the calyx lanceolate, lax, shorter than the disk; flowers many and large, elegant.

tardiflo'rus, (b. Oct. ♃.) leaves sessile serrate, glabrous, spatulate-lanceolate, tapering to the base, deflected at the margin and both sides; branches divaricate; calyx lax, the leafets lanceolate-linear, sub-equal, glabrous; flowers not middle size.

conyzo'ides, (w. Ju. ♃.) leaves oblong, 3-nerved, narrow and acute at the base; upper ones sessile, sub-entire; lower ones petioled, serrate; stem simple, corymbed at the top; calyx cylindric, scurfy; rays 5, very short. About 12 inches high. Flowers small.

carolinia'nus, (p. Oct. ♃.) stem shrubby, flexous, much-branched, pubescent; leaves sessile, oblong-lanceolate, tapering at each end; scales of the calyx lance-linear, very pubescent, sub-squarrose. 10-12 f. *S.*

chinen''sis, (china aster, ☉.) leaves ovate thickly toothed, petioled; cauline ones sessile, at the base wedge-form; floral ones lanceolate, entire; stem hispid; branches 1-flowered; calyx foliaceous. A variety has very full flowers; various colored, and very short rays. Ex.

prenan''thoi'des, (b. ♃.) leaves clasping, spatulate-lanceolate, acuminate, serrate in the middle, heart-form at the base; branchlets pilose; scales of the involucre lanceolate, scurfy.

em''inens, (y-r. S. ♃.) leaves lance-linear, acuminate, scabrous at the margin; lower ones sub-serrate; stem panicled; branchlets 1-flowered; involucre lax-imbricate, with lanceolate leaflets.

grandiflo'rus, (p. y. Oct. ♃.) leaves sub-clasping, linear, subulate, rigid reflex, with the margin ciliate and hispid; stem hairy; branches 1-flowered; involucre squarrose; the scales linear-lanceolate. 2 3 *S.*

squarro'sus, (b-y. S. ♃.) leaves very numerous, sessile, ovate, acute, reflexed, rigid, margin hispid; stem branching, hairy; branches 1-flowered; scales of the involucre lanceolate, hairy, loose. 2 f. *S.*

sca'ber, (p. y. S. ♃.) lower leaves petioled, oblong, cordate, acute, entire; upper ones sessile, clasping, lance-ovate, tapering to an acute point; all the leaves scabrous, undulate; panicle loose, long; the branches racemose. 3 f. *S.*

obova'tus, (w. y. M. ♃.) leaves sessile, oval or obovate, obtuse, sub-rugose, very pubescent; corymb paniculate; scales of the involucre closely imbricate. 3 f. *S.*

ASTRAG″ALUS. 16—10. (*Leguminosæ.*) [A Greek word, signifying a leguminous plant.]

canaden″sis, (J. y. ♃.) caulescent, diffuse; leafets 10-12 pairs, with an odd one, smooth on both sides; legume sub-cylindrical, mucronate. Barren fields. 2 f.

glaux, (milk vetch, ☉.) caulescent, the little heads peduncled, imbricate, ovate; flowers erect; legume ovate, callous, inflated. Ex.

depres″sus, (trailing vetch, ♄.) sub-caulescent, procumbent; leafets obovate; raceme shorter than the petiole; legume terete, lanceolate, reflexed. Ex.

ASTRO'PHIA. 16—10. (*Leguminosæ.*)

littora'lis, (♃.) silky, pubescent; racemes about 5-flowered; leaves pinnate, small; leafets in 2 or 3 pairs, linear-spatulate; seeds globose, brown.

ATRI'PLEX. 5—2. (*Atriplices.*) [Latin, signifying dark.]

horten″sis, (garden orache, Ju. ☉.) stem erect, herbaceous; leaves triangular, dentate, green on both sides; calyx of the fruit ovate, reticulate, entire; flowers in racemes or spikes. Waste places. Flowers green. 3-4 f.

lacinia'ta, (☉.) stem erect, herbaceous; leaves triangular, deep-toothed, white beneath; calyx of the fruit rhomboid, 3-nerved, denticulate.

ATRO'PA. 5—1. (*Solaneæ.*) [From *Atropos*, the goddess of destiny, in allusion to its fatal effects.]

physalo'ides, (w. b. Ju. ☉.) stem very branching; calyx 5-angled, reticulate; berry fleshy, covered with the calyx; leaves sinuate-angled.

belladon″na, (deadly night-shade, w. y. ♃.) stem herbaceous; leaves ovate, entire.

AVE'NA. 3—2. (*Gramineæ.*) [From the Latin *aveo*, to covet, a favorite of cattle.]

præ'cox, (dwarf oats, J. ☉.) panicle oblong, in a dense raceme; florets as long as the glumes; awn exserted; leaves setaceous. Sandy fields.

steril″is, (animated oats, Ju. ☉.) panicled; calyx about 5-flowered; florets hairy, the middle ones awnless. The heads are set in motion, when moistened, by the untwisting of the awns. Ex.

sati'va, (oats, J. ☉.) panicled; 2-seeded; seeds smooth, one of them awned. First discovered in the island of Juan Fernandez. A variety is awnless, and has black seeds. Ex.

elat'ior, (J. ♃.) panicle sub-contracted, nodding; glume 2-flowered; florets perfect, sub-awnless, staminate awned; culm geniculate, glabrous; root creeping. Introduced.

AVICEN″NIA. 13—2. (*Polemonia.*) [After an Arabic physician of repute.]

tomento'sa, (mangle, ♄.) flowers in sub-sessile clusters; leaves oblong, obtuse, tomentose beneath. 20 f. *S.*

AZA'LEA. 5—1. (*Rhododendra.*) [From *azaleos*, dry, growing in dry soil.]

nudiflo'ra, (early honeysuckle, r. M. ♄.) sub-naked-flowered; leaves lanceolate-oblong, or oval, smooth or pubescent, uniform-colored, nerves on the upper side downy, and beneath bristly, margin ciliate; flowers abundant, not viscous, their tubes longer than their divisions; teeth of the calyx short, oval, sub-rounded; stamens very much exsert. A variety, *coccin″ea*, has scarlet flowers and minute calyx; another, *car″nea*, has pale red flowers, with red bases and leafy calyx; another, *al″ba*, has white flowers, with a middling calyx; another, *papiliona'cea*, has red flowers, with the lower divisions white, calyx leafy; another, *parti'ta*, has flesh-colored flowers, 5-parted to the base; another, *polyan″dria*, has rose-colored flowers, with from 10 to 20 stamens Woods. 2-6 f.

visco'sa, (white honeysuckle, w. J. ♄.) leafy; branches hispid; leaves oblong-obovate, acute, glabrous, and one-colored; flowers viscous, tube twice as long as the divisions; teeth of the calyx very short, rounded; flowers very sweet-scented.

procum″bens, (Ju. ♄. r.) stems diffusely procumbent; leaves opposite, elliptical, glabrous, revolute on the margins; corolla bell-form, glabrous; filaments enclosed, equal. High mountains. Northern. Flowers small, in small terminal umbels or corymbs. 3-4 i.

canes″cens, (r. J. ♄.) sub-naked-flowered; leaves obovate-oblong, pubescent on the upper side, and downy beneath, nerves not bristle-bearing; flowers not viscous; tube of the corolla scarcely shorter than its divisions; teeth of the calyx very short, round-obtuse; stamens scarcely exsert. Catskill mountains.

arbores″cens, (r. ♄.) flowers leafy; leaves obovate, sub-obtuse, smooth both sides, glaucous beneath, ciliate on the margin, nerve almost smooth; flowers not viscous; tubes longer than the segments; calyx leafy, with oblong-acute segments; filaments exsert. 15 f.

nit″ida, (swamp honeysuckle, w. J ♄.) leafy-flowered; branches smoothish; leaves few, oblanceolate, sub-mucronate, leathery, glabrous both sides, and the upper side shining, nerve bristle-bearing beneath, margin revolute-ciliate; flowers viscous; tube somewhat longer than the divisions; calyx very short; filaments exsert; leaves dark green. Swamps.

glau'ca, (fragrant honeysuckle, w. J. ♄.) leafy-flowered; branches hispid; leaves oblanceolate, acute, both sides glabrous and glaucous beneath, nerve bristle-bearing, margin ciliate; flowers very viscous; tube of the corolla twice as long as its divisions; calyx very short; filaments about equal to the divisions of the corolla; rather lower than the other species; flowers abundant. Perhaps this is a variety of the *viscosa.*

bico'lor, (r. w. M. ♄.) naked-flowered; leaves obovate, covered on both sides with fine, whitish hairs, the nerve not bristled; flowers small, not viscid; the tube scarcely longer than the segments of the corolla; calyx very short, one segment narrow, and 4 times longer than the rest; filaments longer than the tube; smaller branches hairy and hispid. 2-8 f. *S.*

BAC″CHARIS. 17—2. (*Corymbiferæ.*) [Dedicated to Bacchus.]

halimifo'lia, (w. S. ♄.) leaves obovate and oval, incisely toothed near the summit; panicle compound, leafy; heads of flowers peduncled; egret of the fertile florets hairy, twice as long as the corolla. The whole plant is covered with a whitish dust. 16-12 f. Groundsel-tree.

BÆOMY'CES. 21—5. (*Algæ.*)

rose'us, crust uniform, warty, white; peduncle (podetia) short, cylindric; receptacle sub-globose, pale red. On the earth.

BALLO'TA. 13—1. (*Labiatæ.*) [From *ballo,* to put forth, *otos,* the ear.]

ni'gra, (black horehound, ♄.) leaves undivided, ovate, serrate; calyx dilated above, sub-truncate, with spreading teeth; flowers purple or white, in axillary whorls. 2-3 f.

BAPTI'SIA. 10—1. (*Leguminosæ.*) [From *bapto,* to dye.]

tincto'ria, (wild indigo, y. Ju. ♃.) very glabrous and branching; leaves ternate, sub-sessile, leafets wedge-obovate, round-obtuse, becoming black in drying; stipules obsolete, oblong-acute, much shorter than the petioles; racemes terminal; legumes ovate, long-stiped. 2-3 f.

al″ba, (w. J. ♃.) branches spreading; leaves ternate. petioled; leafets lanceolate, wedge-form at the base, obtuse, mucronate, glabrous; stipules subulate, shorter than the petioles; racemes terminal. 2 f. *S.*

cæru'lea, (spiked indigo weed, b. Ju. ♃.) glabrous; leaves ternate, short-petioled; leafets oblong, wedge-form, obtuse; stipules lanceolate, acute, twice as long as the petioles; racemes spiked, elongated; legumes acuminate.

BARBARE'A. 14—2. (*Cruciferæ.*)

vulga'ris, (J. ♃. y.) lower leaves lyrate, the terminal lobes roundish; upper ones sessile, obovate, toothed; pod 4-sided, tapering into a slender style; flowers in corymbs, small. Bitter winter cress; found in old fields. 12-18 i.

BARTO'NIA. 11—1. (*Onagræ.*) [In honor of Dr. Barton, of Phil.]

lævicau'lis, (w. J.) petals 5, stamens 5; petalloid; bracts 0; stem very smooth; seeds winged.

parviflo'ra, (w. J.) petals 5; stamens 5-7, petalloid; bracts 0; stem scabrous; seeds winged.

BART″SIA. 13—2. (*Scrophularia.*)

pal″lida, (white painted cup, w-y. Au ♃.) leaves alternate, linear, undivided, upper ones lanceolate, floral ones sub-oval, sub-toothed at the summit, all are 3-nerved; teeth of the calyx acute.

acumina'ta, (♃.) leaves alternate, long-linear; floral leaves ovate, long-acuminate, 3-nerved, all undivided; flowers shorter than the bracts; teeth of the calyx acute.

tenuifo'lia, (y. Ju. ♃.) very hirsute, leaves alternate, linear, gash-pinnatifid, divisions filiform; bracts (yellow) membranaceous, oblong, obtuse, tooth-hastate at the base on each side, longer than the flowers, calyx short, hairy, with subulate teeth. 1 f.

BATSCH″IA. 5—1. (*Boragineæ.*) [In honor of Batsch, a German.]

canes″cens, (puccoon, Ju. ♃.) whitish villose; leaves all oblong; calyx short; divisions of the corolla entire. Hills. Flowers axillary, crowded near the top of the stem, bright orange. The root is used by the Indians as a red dye.

gmeli'na, (r-y. Ap. ♃.) hirsute, floral leaves ovate; segments of the calyx long, sub-lanceolate. Dry woods. 10-16 i.

longiflo'ra, (y. Ju. ♃.) hirsute, erect; leaves approximating, long-linear, margin reflexed, fascicles fastigiate; tube of the corolla sub-pentangular; border flat, with fringed crenatures. *S.*

decum″bens, hirsute; stem decumbent, segments of the calyx and leaves linear; flowers scattered; lobes of the corolla fringed-crenate, shorter than the tube. *S.*

BEJA'RIA. 12—1. (*Rhodendra.*) [In honor of a Spanish botanist.]

racemo'sa, (w-r. J. ♄.) leaves lance-ovate, glabrous; flowers in a panicled raceme, terminal; stem hispid. 3 f. Sandy plains. *S*

BEL″LIS. 17—2. (*Corymbiferæ.*) [From *bellus,* handsome.]

peren″nis, (daisy, w. and p. Ap. ♃.) leaves obovate, crenate; scape naked 1-flowered. Ex.

integrifo'lia, caulescent; leaves entire, lower ones obovate, upper ones lanceolate leafets of the calyx very acute, and acuminated with a hair. *S.*

BER″BERIS. 6—1. (*Berberides.*) [From *berberi,* Arabic, signifying wild.]

vulga'ris, (barberry, y. M. ♄.) branches punctate; prickles mostly in threes; leaves obovate, remotely serrate; flowers racemed

canaden″sis, (Ju. ♄.) branches verrucose-dotted, with short tripple spines; leaves spatulate-oblong, remotely serrate, with somewhat bristly teeth; racemes sub-corymbose few-flowered: petals emarginate; berries sub-globose, or oval. 2-3 f. Virginia, Georgia.

BE'TA. 5—2. (*Atriplices.*) [So called from the river Bœtis, in Spain, where it grows wild.]

vulga'ris, (beet, g. Au. ♂.) flowers heaped together; lower leaves ovate. Ex.

ci'cla, (white beet, ♂.) flowers in threes radical leaves petioled, cauline ones sessile lateral spikes very long. Ex.

BE'TULA 19—12. (*Amentaceæ.*) [Latin, birch.]

populifo'lia, (white birch, poplar birch, Ju. ♄.) leaves deltoid, long-acuminate, unequally serrate, very glabrous; scales of the strobile with rounded, lateral lobes; petioles glabrous. 30-40 f.

papyra'cea, (paper birch, ♄.) leaves ovate, acuminate, doubly serrate; veins hirsute beneath; petiole glabrous; pistillate ament peduncled, nodding; scales with lateral, short, sub-orbicular lobes. The bark used by the Indians for canoes.

len''ta, (black birch, M. ♄.) leaves heart-ovate, sharp-serrate, acuminate; nerves and petioles pilose beneath; scales of the strobile glabrous, with obtuse, equal lobes, having elevated veins. Wood resembles mahogany. Very sweet-scented. 80 f.

glandulo'sa, (scrub birch, M. ♄.) branches glandular-dotted, glabrous; leaves obovate, serrate, at the base entire, glabrous, subsessile; pistillate ament oblong, scales half 3-cleft; fruit orbicular, with a narrow margin. 2-8 f.

pu'mila, (dwarf birch, J. ♄.) branches pubescent, dotted; leaves orbicular-obovate, petioled, dense-pubescent beneath, pistillate ament cylindric. 2-3 f.

BI'DENS. 17—3. (*Corymbiferæ.*) [From *bis*, two, and *dens*, tooth.]

cer''nua, (y. Au. ☉. water beggar-ticks,) flowers sub-radiate, cernuous; outer involucre as long as the flower; leaves lanceolate, sub-connate, dentate. Ponds and ditches. 1-2 f.

chrysanthemoi'des, (daisy beggar-ticks, Au. ☉.) flowers rayed, drooping rays erect, longer than the sub-equal involucre; leaves oblong, tapering both ends, toothed, connate; flowers large.

bipin''na'ta, (hemlock beggar-ticks, y. Ju. ☉.) flowers sub-rayed; outer involucre of the length of the inner; leaves doubly pinnate, leafets lanceolate, pinnatifid.

BIGNO'NIA. 13—2 (*Polemoniæ.*) [In honor of the Abbe Bignon.]

radi'cans (trumpet flower, r. and y. Ju. ♄.) leaves pinnate, leafets ovate, toothed, acuminate; corymb terminal; tube of the corolla thrice as long as the calyx; stem rooting. Most beautiful climbing shrub. One variety, *flam''mea*, has yellowish scarlet flowers; another variety, *coccin''ea*, has bright scarlet flowers. Cultivated.

crucif''era, (y. r. J. ♄.) leaves conjugate, cirrose; lower ones ternate; leafets heart-ovate, acuminate; racemes axillary; stem muricate.

BLI'TUM. 1—2. (*Atriplices.*) [From the Greek *bliton*, an insipid pot-herb.]

capita'tum, (strawberry blite, r. J. ☉.) heads in a terminal spike, not intermixed with leaves; leaves triangular, toothed. 15 i.

mariti'mum, (Aug. ☉.) stem erect; perianth membranaceous; clusters axillary, spiked, naked; leaves lanceolate, tapering to each end, gash-toothed. Salt marshes. 1-2 f.

virga'tum, (slender blite, r. J. ☉.) lateral heads scattered, top ones leafy; leaves triangular-toothed.

BOERHAA'VIA. 3—1. (*Nyctagines.*) [In honor of Boerhaave, the celebrated physician.]

erec''ta, (w. p. J. ♃.) stem columnar, trichotomous, rough below, smooth above; flowers in corymb-panicles. *S.*

BOLE'TUS. 21—6. (*Fungi.*) [From *bolos*, a mass.]

ignia'rius, dilated, smooth, cuticle in ridges; pileus hard, becoming dark at the base, at the margin cinnamon color, beneath yellowish white. Grows on trunks of trees. General form like a horse's hoof. It is called *touchwood.*

BOLTO'NIA. 17—2 (*Corymbiferæ.*)

asteroi'des, (false aster, w. r. Au. ♃.) leaves very entire; flowers long-peduncled; seed oval, sub-awnless, glabrous.

glastifo'lia, (false camomile, w. Ju. ♃.) lower leaves serrate; flowers short-peduncled; akenes obcordate, apparently winged, pubescent; awns of the egret two, of equal length with each other. Resembles an''themis cot''ula.

BORA'GO. 5—1. (*Boragineæ.*) [Formerly called *corago*, from *cor*, the heart, and *ago*, to affect, because it was thought to cheer the spirits.]

officina'lis, (borage, b. Ju. ☉.) leaves alternate; calyx spreading. Ex.

africa'na, (☉.) leaves opposite, petioled, ovate; peduncle many-flowered. Ex.

BOTRYCH''IUM. 21—1. (*Filices.*) [*Botrus*, a bunch of grapes, from the fructification resembling one.]

fumarioi'des, (grape fern, J. ♃.) stipe naked; frond smooth, radical, 3-parted, bipinnate, leafets lunate, crenate; spikes bipinnate.

virgin''icum, (rattlesnake fern, Ju.) somewhat hairy; scape bearing the frond in the middle; frond 3-parted, bipinnatifid; divisions incisely pinnatifid; segments obtuse about 3-toothed; spikes decompound. 2 f.

BRAS''SICA. 14—2. (*Cruciferæ.*)

ra'pa, (turnip, ♂.) root caulescent, orbicular, depressed, fleshy; radical leaves rough, cauline ones very entire, smooth. Var. *ruta-baga*, has a turbinate, sub-fusiform root. Ex.

olera'cea, (common cabbage, including all the varieties caused by culture, ♂.) root caulescent, terete, fleshy; leaves smooth, glaucous, repand-lobate. Ex.

na'pus, (kale or cole, ♂.) root caulescent, fusiform; leaves smooth, upper ones heart-lanceolate, clasping, lower ones lyrate-toothed.

BRICKEL''LIA. 17—1. (*Cinerocephalæ.*)

cordifo'lia, (p. Au.) involucre many-flowered; corolla tubular, 5-cleft; stamens attached to the corolla; akenes long, hairy, lower leaves cordate, acuminate, dentate, pubescent; upper ones obtuse; receptacle naked and dotted.

BRI'ZA 3—2. (*Gramineæ.*) [From the Greek *britho*, to nod.]

me'dia, (quaking grass, rattlesnake grass, J. ♃.) panicle erect; spikelets heart-ovate about 7 flowered; calyx smaller than the flowers. 1 f. Probably introduced

BRODIÆ'A. 6—1. (*Narcissi.*) [In honor of James Brodie.]
grandiflo'ra, (Ap. ♃.) umbels many-flowered; flowers pedicelled; stamens alternate, with membranaceous margins. Missouri hyacinth. *S.*

BRO'MUS. 3—2. (*Gramineæ.*) [*Bromos,* a species of wild oats.]
secali'nus, (chess, J. ☉.) panicle nodding, spikelets ovate, compressed; glumes naked, distinct; awns shorter, subulate, straightish-zigzag. Florets about 10 in each spikelet; leaves somewhat hairy. Common in rye and wheat fields.
pubes''cens, (broom grass, J. ♃.) culm hairy below; joints brown; stipules very short; panicle at length nodding, pubescent; glumes less than paleas, 8 to 12-flowered; paleas pubescent, one valve awned beneath the apex. Var. *cilia'tus* has a ciliate valve in each palea; 8 to 10 flowered. Var. *canaden''sis,* has one very hairy 7-nerved valve in each palea, and a short bristle.
mol''lis, (Ju.) panicle erect, compact; peduncles ramose; spikelets ovate; florets imbricate, depressed, nerved, pubescent; bristle straight, nearly as long as the paleas; leaves with short hairs.

BROUSSONE'TIA. 20—4. (*Urticeæ.*) [In honor of Broussonnet.]
papyrif''eræ, (M. ♄.) leaves sub-cordate, lobed or undivided; roots sending off suckers. 20 f. Paper mulberry. Ex.

BRUNNICH''IA. 8—3. (*Polygoneæ.*)
cirrho'sa, (♃.) climbing; leaves cordate, acute, glabrous, entire; panicles terminal; bracts ovate, mucronate. *S.*

BRYOPHYL''LUM. 8—4. (*Semperviveæ.*)
calyci'num, (leaf plant, sprout leaf, r-g. Ju. ♃.) leaves remarkably thick and succulent, crenate-serrate, oval; petioled, channeled above; leafets in pairs; flowers long-cylindric, pendulous. Ex.

BUCHNE'RA. 13—2. (*Jasmineæ.*)
america'na, (blue-hearts, b. Au. ♃.) stem simple; leaves lanceolate, sub-dentate, rough, 3-nerved; flowers remote, spiked. 1 f.

BUPLEU'RUM. 5—2. (*Umbelliferæ.*) [Named from the stiff striated leaves of some of the species.]
rotundifo'lium, (hare's-ear, or thorough-wax, y. Ju. ☉.) leaves perfoliate, broadly egg-shape, alternate. 1 f. Ex.

BUX''US. 19—4. (*Euphorbiæ.*) [From the Greek, signifying hard.]
sempervi'rens, (box, ♄.) leaves ovate, petioled, somewhat hairy at the margin; anthers ovate, arrow-form. Var. *angustifo'lia,* lanceolate leaves. *Suffrutico'sa,* leaves obovate, stem hardly woody. Ex.

CACA'LIA. 17—1. (*Corymbiferæ.*) [From *kakon,* bad, and *lian,* exceedingly, because it is bad for the soil.]
atriplicifo'lia, (wild caraway, w. Au. ♃.) stem herbaceous; leaves petioled, smooth, glaucous beneath; radical ones cordate, toothed; cauline ones rhomboidal; flowers corymbed, erect; involucrum 5-flowered. Low ground. 3-6 f.
coccin''ea, tassel-flower; from the East Indies. 18 i. The flowers of a scarlet color.
ova'ta, (w. Oc.) stem herbaceous, leaves ovate, obtuse; obtusely toothed, nerved slightly glaucous beneath; the lower ones petioled; involucre 5-leaved; 5-flowered. 3-4 f. *S.*
lanceola'ta, (y. w.) stem herbaceous, leaves narrow-lanceolate, acute at each end, remotely-toothed, nerved, slightly glaucous beneath; involucre 5-leaved, 5-flowered. 4-6 f. *S.*

CAC''TUS. 11—1. (*Cacti.*) [A Greek word, signifying prickly.]
opun''tia, (prickly-pear, S. y. J. ♃.) proliferous; articulations compressed, ovate; bristle fasicular. The plant appears like a series of thick succulent leaves, one growing from the top of another. Ex.
phyl''lanthoi'des, (leaf flowered, prickly pear, r. Oc.) branches leaf-life, ensiform, compressed, obovate with spreading rounded teeth; spines few, setaceous, longer than the woody covering. 2 f. Ex.
vivipa'rus, (r. Ju. ♃.) roundish, manifold or cespitose; tubercles cylindric, bearded, grooved and proliferous above the furrows. *S.*
mammilla'ris, tubercles ovate, terete, bearded; flowers scarcely exserted; berries scarlet, about equal with the tubercles. *S.*
fe'rox, (y. & r. Ju.) proliferous; articulalations large, nearly circular, spiny; spines double; larger ones radiate, persistent; fruit dry, spiny. *S.*
fragil''is, proliferous; articulations short, oblong, somewhat terete, fragile; spines double; flowers solitary, small; fruit dry spiny. *S.*
cylin''dricus, (p. ♄.) very branching, terminal branches consisting of long cylindrical articulations; surface reticulated with decussate furrows. *S.*

CALAMIN''THA. 13—1. (*Labiatæ.*) [From *kalos,* beautiful, *mentha,* mint.]
grandiflo'ra, (mountain calamint, r. Ju.) suffruticose; leaves ovate, obtuse, crenate, smooth; whorls many-flowered, on short peduncles, shorter than the leaves. 12-18 i. *S.*
nepe'ta, (r-w. J. ♃.) pubescent, very branching; whorls peduncled, dichotomous-corymbed, longer than the leaves, leaves ovate, obtuse, sub-serrate; down or wool of the calyx prominent. *S.*

CAK''ILE. 14—1. (*Cruciferæ.*) [From Latin word, signifying noise, alluding to the rattling of the seeds.]
america'na, (p. Oct. ☉, American sea-rocket,) leaves fleshy, oblong, obtuse margins toothed, joints of the pouch one-seeded; the upper ones ovate, acute. Sea coast, shores of the great lakes. Plant fleshy, branched, decumbent. Flowers corymbed.

CALANDRIN''IA. 12—1 (*Portulacceæ.*) [From *kalos,* beautiful, *andron,* stamen.]
specio'sa, (p.) glabrous, diffuse; leaves spatulate, acute, attenuate into a petiole; flowers racemed; peduncles shorter than the bracts; petals longer than the calyx 4-5 i. California. Var. *grandiflo'ra,* the flowers, notwithstanding its name, are

smaller than those of the *disco'lor*, this last being one of the most splendid flowers growing in the open air.

CALEN″DULA. 17—4. (*Corymbiferæ.*) [So called because it flowers every month, from *calends*, month.]

officina'lis, (pot marygold, y. ☉.) seed keeled, muricate, incurved. Ex.

stella'ta, starry marygold. Barbary orange. 2 f.

pluvia'lis, (rainy marygold,) florets of the ray pure white inside, dark purple outside.

hybrida, dingy orange on the outside.

CAL″LA. 19—12. (*Aroideæ.*) [From *kalos*, beautiful.]

palus'tris, (water arum, w. J. ♃.) leaves sub-roundish, heart-form, acute; spatha ovate, cuspidate, spreading when mature. Grows in wet places.

ethio'pica, Egyptian lily. Ex.

CAL″LICAR″PA. 4—1. (*Vitices.*) [From *kalos*, beauty, *karpos*, fruit.]

america'na, (r. J.) leaves serrate, tomentose beneath. 3-4 f. *S.*

CAL″LITRI'CHE. 1—2. (*Onagræ.*) [From *kalos*, beauty, and *trichos*, hair, appearing like hair.]

ver″na, (water chickweed, w. M. ☉.) upper leaves spatulate, obovate, lower ones linear, obtuse, and emarginate; flowers polygamous. In shallow streams. Stem floating. 2-3 f. Upper leaves in a tuft. Flower solitary, axillary.

CAL″OCHOR″TUS. 6—3. (*Narcissi.*)

ele'gans, (w. and p. ♃.) scape nearly 3-flowered, shorter than the single leaf; petals woolly within. *S.*

lute'us, (y. ♃.) stem forked, about 2-flowered; leaves setaceous, short; flowers large, inner petals the largest, glabrous at the apex, spotted, ciliate at the base; a mark in the claws of the downy petals; root bulbous.

CAL″THA. 12—12. (*Ranunculaceæ.*) [A Greek word, signifying yellow.]

palu'stris, (y. Ap. ♃. American cowslip,) stem erect; leaves cordate, sub-orbicular, acute-crenate. 12-18 i.

integer″rima, (M. ♃.) stem erect, corymbose; leaves orbicular-cordate, very entire, with the sinus closed; floral ones sessile, reniform, obsoletely crenate at the base; sepals oval, obtuse.

parnassifo'lia, (y. Ju. ♃.) stem erect, 1-flowered, 1-leaved; radical leaves petiolate, lanceolate-cordate, obtuse, many-nerved; sepals elliptical.

sagita'ta, (w. J.) scape 1-flowered; leaves ovate, obtuse, entire, heart-sagittate at the base with inflexed auricles above; divisions of the nectary 9. Pistils 13 to 15. *S.*

CALYCAN″THUS. 11—12. (*Rosaceæ.*) [From *calyx*, and *anthos*, the flower being inserted into the calyx.]

lævigа'tus, (b-p. Ju. ♄.) lobes of the calyx lanceolate, calyx brownish purple; leaves oblong, or oval, gradually acuminate, somewhat rugose, smooth and green on both sides; branches erect, straight; flowers large solitary, terminal. 4-6 f.

flori'dus. (Carolina allspice, p. M. ♄.) divisions of the calyx lanceolate; leaves broad-oval, acute, tomentose beneath; branches spreading. 3-7 f. *S.*

CALLIGO'NUM. 12—4. (*Polygoneæ.*)

canes″cens, (Ju. ♄.) diœcious, leaves lanceolate; flowers axillary, crowded, spiked toward the ends of the branches. *S.*

CALYP″SO. 18—1. (*Orchideæ.*) [From the fabled nymph, Calypso.]

america'na, lip narrowed, sub-unguiculate at the base, spur semi-bifid, longer than the lip, with acute teeth; peduncle longer than the ovary. Scape 6-8 inches high, sheathed, 1-flowered; radical leaves roundish-ovate, nerved. Flowers large, purplish, resembling a Cypripedium.

CAMELI'NA. 14—1. (*Cruciferæ.*)

sa'tiva, (wild flax, gold-of-pleasure, y. J. ☉.) silicle obovate-pyriform, margined, tipped with the pointed style; leaves roughish, sub-entire, lanceolate, sagittate; flowers small, numerous, in corymbs. 2 f. Cultivated grounds. Introduced.

CAME'LLIA. 12—13. (*Meliæ.*) [From *Camellas*, a learned Jesuit.]

japon″ica, (Japan rose,) leaves ovate, acuminate, acutely serrate; flowers terminal, sub-solitary. By some, the Tea (Thea) is classed in the genus Camellia.

CAMPAN″ULA. 5—1. (*Campanulaceæ.*) [Latin, *campanula*, a little bell.]

rotundifo'lia, (flax bell-flower, hair-bell b. J. ♃.) glabrous; radical leaves heart-reniform, crenate; cauline ones linear, entire; panicle lax, few-flowered; flowers nodding.

america'na, (b. Au. ♃.) leaves ovate-lanceolate, long-acuminate; lower ones sub-cordate, with the petioles ciliate; flowers axillary, nearly sessile, in a terminal leafy raceme; corolla sub-rotate; style exsert. Cultivated. 2 f.

spec″ulum (b. Au. ☉.) stem branched leaves oblong, sub-crenate; flowers solitary, scales at the base. Purple. South of Europe. 1 f. Venus' looking-glass.

amplexicau'lis, (clasping-bell, b. M. ☉.) stem simple, erect; leaves heart-form, crenate, clasping; flowers axillary sessile, glomerate. 12-18 i.

erinoi'des, (prickly bell flower, w-b. J. ☉.) slender; stem simple, angular; angles, and the margin and nerves of the leaves, with reverse prickles; leaves linear-lanceolate, glabrous on the upper side; peduncles few; those on the top of the stem flexuose; axillary ones 1-flowered, filiform. 12 i.

uniflo'ra, pubescent; radical leaves round-obovate; cauline ones lance-linear, somewhat toothed; stem about 1-flowered.

me'dium. (canterbury bells, w. b. Au. ♂.) capsule 5-celled, covered; stem undivided, erect, leafy; flowers erect. Ex.

CAN″NA. 1—1. (*Cannæ.*) [From the Hebrew, signifying a reed.]

flac″cida, (y. J. ♃.) inner limb of the corolla 3-cleft; segments flaccid. 2-3 f. *S.*

indica, Indian shot plant. 4 f. Scarlet. A native of the East Indies.

CAN″NABIS. 20—5. (*Urticæ.*) [From the Arabic *kannaba*, to mow.]

sati'va (hemp, g. Au ☉.) stem pilose

leaves petioled, digitate; leafets lanceolate, serrate, pilose; staminate flowers solitary, axillary; pistillate ones spiked. 4-10 f. Ex.

CAPRA′RIA. 13—2 (*Vitices.*) [From *capra*, a goat.]

pusil″la, (w. ⊙.) hairy, leaves opposite, cordate, repand-toothed, petioled; peduncles axillary, longer than the petioles. *S.*

CAP″SICUM. 5—1. (*Solaneæ.*) [From *kapto*, to bite, on account of its effect upon the tongue.]

an″nuum, (guinea pepper, red pepper, cayenne pepper, y-g. w, Au. ⊙.) stem herbaceous; peduncles solitary. From South America. 10-18 i.

bacca′tum, (bird pepper, ♄.) stem smooth; peduncles in pairs. Florida.

CARDAM″INE. 14—2. (*Cruciferæ.*) [From *kardia*, the heart, because it acts as a cordial.]

pennsylvan″ica, (American water-cress, w. M. ♃.) glabrous, branching; leaves pinnate, hairy; leafets roundish-oblong, obtuse, tooth angled; silique narrow, erect.

praten″sis, (field water-cress, r-p. M. ♃.) simple, glabrous, erect; leaves pinnate; radical leafets roundish, toothed; cauline ones lanceolate, sub-entire; racemes sub-corymbed.

CARDIOSPER″MUM. 8—3. (*Sapindi.*)

halica′bum, (Au. ⊙.) glabrous; leafets incised and lobed; the terminal one rhomboidal. Balloon vine. East Indies. 5 f. Flowers white and green.

CAR″DU′US 17—1. (*Cinarocephalæ.*) [From *keiro*, to tear.]

pectina′tus, (p. ♂.) unarmed; leaves decurrent, lanceolate, pectinately pinnatifid; peduncles almost leafless, terminal, very long, about 1-flowered; flowers nodding, often discharging the pollen; scales of the calyx linear, spreading.

CA′REX. 19—3. (*Cyperoideæ.*) [From Latin *carere*, to want, the upper spikes of these plants being constantly without seeds, consisting only of staminate flowers.]

A. *Inflorescence diœcious.*

steril″is, (barren sedge, M. ♃.) spikes diœcious; sterile 3-5; fertile about 6; (sometimes androgynous;) fruit ovate, compressed, triquetrous; margin ciliate-serrate; apex recurved and bicuspidate. 8-12 i. Wet.

B. *Inflorescence monecious.*

† *Spikes androgynous.*

* *Spike solitary.*

a. *Stamens at the summit of the spikelets.*

frase′ri, (Ap. ♃.) spike simple, ovate; fruit ovate-sub-globose, entire at the point, longer than the oblong glume; leaves lanceolate, undulate, crenulate; scape-sheathed at the base. 1 f. This species has broader leaves than the common sedges, and produces fine flowers resembling small lilies.

polytrichoi′des, (M. ♃.) spike simple, fruit oblong-lanceolate, compressed, triquetrous, obtuse, emarginate; glumes oblong-obtuse, mucronate. 10 i. Wet.

** Spikes distinct (*not aggregated into head*).

a. Stamens at the summit.

1. With 2 stigmas.

retroflex″a, (M. ♃.) spikes about 4, sub-approximate, ovate, the lowest one with a short bract; fruit ovate-lanceolate, bidentate, scabrous on the margin, spreading and reflexed, as long as the ovate-acute glume 1 f. Woods, meadows.

ro′sea, (M. ♃.) spikes 4-6, remote, about 9-flowered, the lowest one with a setaceous bract overtopping the culm; fruit ovate, acuminate, diverging and radiate, scabrous on the distinct margin, twice as long as the ovate-obtuse glume. 12 i. Moist.

stipa′ta, (M. ♃.) spike compound, oblong spikes numerous (10-15), oblong, aggregated, bracteate; bracts a little longer than the spikelets; fruit lanceolate, subterete, and smooth below, spreading, bidentate at the point, which is scabrous, twice as long as the glume. 1-3 f. Wet meadows.

2. *With* 3 *stigmas.*

peduncula′ta, (Ap. ♃.) spikes about 4, on long peduncles, very remote; fruit obovate, triquetrous, obtuse, smooth, entire at the orifice; glumes ovate, mucronate (purple and green). 6 i. Rocky Hills.

b. *Pistillate at the summit.*

1. *With* 2 *stigmas.*

scopa′ria (M. ♃.) spikelets mostly 5 ovate, sessile, approximate, aggregate, lowest one bracteate; fruit ovate-lanceolate, margined, nerved, smooth, bi-cuspidate, longer than the lanceolate acuminate glume 1-2 f. Swamps.

scirpoi′des, (M. ♃.) spikes 4, ovate, obtuse, approximate, uppermost one clavate; fruit ovate, bidentate, plano-convex, erect and a little spreading, but not reflexed, sub-cordate, serrulate, longer than the ovate obtuse glume.

2. *With* 3 *stigmas.*

atra′ta, (J. ♃.) androgynous spikes 3, pedunculate, crowded, sub-pendulous in fruit, (black); fruit roundish-ovate, with a short beak, bidentate. 6 i.

c. *Summits of the highest and lowest spikelets staminate, the middle spikes wholly staminate.*

1. *With* 2 *stigmas.*

sicca′ta, (J. ♃.) terminal spikes obtuse lower ones mostly in fours, ovate, somewhat acute; fruit ovate-lanceolate, acuminate, compressed, scabrous on the margin, bifid, nerved, nearly equal to the ovate-lanceolate scale. 12-18 i. Sandy plains.

††. *Terminal spikes androgynous; the rest pistillate; stigmas* 3.

vires″cens, (green sedge, M. ♃.) spikes 3, oblong, erect; upper one pedunculate, sterile below, the rest fertile, sub-sessile, and bracteate; fruit ovate, obtuse, costate, pubescent. 18-24 i. Dry woods. Var. *costa′ta*, has its fruit strongly ribbed, and its outer sheaths purplish-brown; leaves more numerous and larger.

formo'sa (M. ♃.) spikes 4, oblong, thick, distant, on exsert peduncles, nodding, uppermost one sterile at the base; fruit oblong, triquetrous, somewhat inflated, rather acute at each end, orifice nearly entire, or 2-lobed, obscurely nerved, twice as long as the ovate-acute glume. 12-18 i. Wet.

††† *Staminate and pistillate spikes distinct.*
* *Staminate spike solitary.*
1. *With* 2 *stigmas.*

au'rea, (J, ♃.) fertile spikes mostly 3, oblong, loose flowered, sub-pendulous, rather approximate, lower ones pedunculate; fruit obovate or pyriform, obtuse, nerved, entire at the orifice, longer than the ovate-acute glume. 4-10 i. Wet rocks

2. *With* 3 *stigmas.*
§ *Pistillate spikes sessile, or with the peduncles enclosed.*

vesti'ta, (J. ♃.) sterile spike mostly solitary, (rarely geminate, with the upper one elongated), pedunculate, cylindrical-oblong; fertile spikes 2, ovate-oblong, sessile, sub-approximate, sometimes sterile at the summit; fruit ovate, sub-triquetrous, nerved, with a short rostrum pubescent, rather longer than the ovate-mucronate glume. 2 f. Wet.

tentacula'ta, (M. ♃.) fertile spikes 2-3, (rarely 4), sessile, ovate or ovate-cylindrical, approximate, horizontal; bracts very long; fruit ovate, ventricose, nerved, with a very long rostrum, orifice bidentate, longer than the lanceolate glume. 12-18 i. Wet.

§§ *Pistillate spikes on exsert peduncles, partly sheathed at the base.*

conoi'dea, (M. ♃.) fertile spikes 2-3, oblong, remote, rather loose, uppermost sub-sessile, lower ones on long peduncles; fruit oblong-conical, obtuse, recurved at the apex, as long as the awned glume. 6-12 i. Woods.

plantagin''ea, (Apr. May, ♃.) fertile spikes mostly 4, on peduncles scarcely exserted, loosely flowered; fruit oblong-cuneiform, triquetrous, recurved at the apex; culm sheathed at the apex; sheaths of the culm all leafless, (colored); leaves broad. 8-12 i.

washingto'niana, (J. ♃.) sterile spike solitary, erect; fertile spikes oblong, cylindric, sub-sessile, sub-remote, erect; flowers somewhat scattered; fruit oval, acute at each end, compressed, shortly beaked, with a smooth and entire orifice, about equalling the ovate-oblong, acutish scale. 1 f. White Mountains, N. H.

§§§ *Pistillate spikes on long peduncles, nearly destitute of sheaths.*

umbella'ta, (M. ♃.) cespitose; fertile spikes mostly 4, ovate, few-flowered, one sessile at the summit of the culm, the rest on radical peduncles and appearing sub-umbellate; fruit ovate, acuminate-rostrate, sub-pubescent, as long as the ovate-acuminate glume. 1-6 i. In small tufts on dry hills.

** *Staminate spikes,* 2 *or more.*
1. *With* 2 *stigmas.*

cespito'sa (M. ♃.) sterile spike sub-solitary, (or geminate); fertile spikes mostly 3, cylindrical, obtuse, distant, the lower on a short exsert peduncle; bracts striate; fruit ovate, somewhat acute, densely fruited in about 8 rows; orifice minute, longer than the ovate (black and margined) glume; leaves spreading. 12-18 i. Mountain bogs.

2. *With* 3 *stigmas.*

retror''sa M. ♃.) sterile spikes about 3, lower one often fertile at the base; fertile spikes about 5, approximate, (and clustered in a sub-corymbose manner), oblong-cylindrical, inclusely pedunculate lowest one often remote; fruit ovate, inflated, reflexed, rostrate, half as long as the lanceolate glume. 2 f. Near ponds in clusters.

CAR''ICA. 20—10. (*Amentaceæ.*) [First cultivated in Caria.]

papa'ya, leaves palmate, 7-lobed, middle lobe sinuate; divisions oblong, acute; staminate flowers corymbed. Papaw tree. Native of Guinea.

CARPI'NUS. 19—12. (*Amentaceæ.*)

america'na, (May ♄.) leaves oblong-ovate, acuminate, unequally serrate; scales of the strobile 3-parted; the middle segment oblique, ovate-lanceolate, toothed on one side. Woods. Hornbeam.

CARTHA'MUS. 17—1. (*Cinarocephalæ.*) [From *kathairo,* cathartic.]

tincto'rious, (false saffron, safflower. y. J. ⊙.) leaves oval, entire, serrate, aculeate. Ex.

cœru'leus, (blue saffron. b. ♃.) stem about 1-flowered; leaves lance-ovate, spine-toothed.

CA'RUM 5—2. (*Umbelliferæ.*) [From *Caria,* a province in Asia.]

ca'rui. (caraway, w. ♂.) stem branching; leaves with ventricose sheaths; partial involucrum none. Ex.

CAR''YA. 19—12. (*Juglandeæ.*) [From *carua,* a nut.]

al''ba, (shag walnut, shag-bark hickory, M. ♄.) leafets about 7; long-petioled, lance-oblong, acuminate, sharply serrate, villose beneath; the terminal leafet sessile; ament filiform, glabrous; fruit globose, a little depressed; nut compressed, oblique.

sulca'ta, (shell-bark hickory, Ap. ♄.) leafets about 9, oblanceolate, acuminate, serrate, pubescent beneath; the terminal leafets sub-sessile, tapering to the base; fruit roundish, 4-keeled; nut sub-globose, a little compressed, smooth, long-mucronate.

ama'ra, (bitter nut, Ap. ♄.) leafets about 9, ovate-oblong, acuminate, sharply serrate, glabrous both sides, the terminal leafets short-petioled; fruit sub-globose, with the sutures prominent above; nut smooth, sub-globose, mucronate; putamen easily broken; nucleus bitter.

porci'na, (pig nut, broom hickory. M. ♄.) leafets about 7, lanceolate, acuminate, serrate, glabrous both sides; terminal leafets sub-sessile; fruit pear-form or globose; nut smooth; putamen very thick and hard; nucleus small. Var. *obcorda'ta* has an obcordate nut. Var. *ficifor''mis* has the fruit turbinate and nut oblong. 70-80 f.

aquat''ica, (Ap. ♄.) leafets about 11, narrow, obliquely lanceolate, acuminate, sub-serrate, glabrous, sessile; fruit peduncled ovate sutured, prominent; nut roundish, compressed, putamen thin; nucleus bitter. 40-50 f. *S.*

olivæfor″mis, (pecan nut, Ap. ♄.) leafets numerous (13-15), lanceolate, sub-falcate, serrate; petioles not in pairs; fruit oblong, 4-sided; nut olive-shaped, smooth. *S.*

CAS″SIA. 10—1. (*Leguminosæ.*) [From the Arabic *katsia*, to tear off, alluding to the peeling of the bark.]

marilan″dica, (wild senna, y. Au. ♃.) somewhat glabrous; leaves in 8 pairs, lance-oblong, mucronate; flowers in axillary racemes, and in terminal panicles; legumes linear, curved. River alluvion. 2-4 f.

chamæchris″ta, (cassia, partridge pea, E. y. Au. ⊙.) somewhat glabrous; leaves linear, in many pairs, the glands on the petioles sub-pedicelled; two of the petals spotted; legumes pubescent. 8-16 i. Dry sand, &c.

nic″titans, (E. y. Ju. ⊙.) spreading, pubescent; leaves in many pairs, linear; glands of the petioles pedicelled; peduncles short, supra-axillary, 2-3 flowered; flowers pentandrous; the leaves of this species, and of the chamæchrista possess a considerable degree of irritability. 12 i.

senn″a, (Egyptian senna, ⊙.) leaves in 6 pairs; petioles glandless; legume reniform. Ex.

to′ra, (y. Ju. ⊙.) glabrous; leaves in 3 pairs, obovate ciliate; terminal ones largest; a subulate gland between the lower pair; peduncles few-flowered, axillary; legumes curved. 3 f. *S.*

occidenta′lis, (y. M. ♃. ♄.) glabrous leaves in 5 pairs, ovate-lanceolate, acuminate, scabrous along the edges; peduncles clustered, few-flowered, axillary; legumes compressed, falcate. 12-18 i. *S.*

linea′ris, (y. J. ♃.) glabrous; leaves in 5 or 6 pairs, ovate, acute; peduncles axillary, few-flowered; legume terete. *S.*

as″pera, (S. ⊙.) strigose, rough; leaves in many pairs, linear, lanceolate, ciliate, peduncles few-flowered, above the axils; stamens 7-9; three longer than the rest. 1-3 f. *S.*

CASTA′NEA. 19—12. (*Amentaceæ.*) [From *Castana*, a city of Thessaly.]

ves″ca, (chestnut, g. J. ♄.) leaves lance-oblong, sinuate, serrate, with the serratures mucronate; glabrous both sides. Large tree.

pu′mila, (chinquapin, g. J. ♄.) leaves oblong, acute, mucronate, serrate, with white down beneath. Small tree. Florida.

CASTILLE′JA. 13—2. (*Pediculares.*) [Named from a Spanish botanist.]

occidenta′lis, (♃.) stem simple, pilose; leaves linear-lanceolate, narrowing toward the apex, minutely pubescent, entire, acutish; flowers spiked, sessile; corolla scarcely exceeding the calyx; bracts 3-cleft; divisions erect.

CATAL″PA. 2—1. (*Bignoniæ.*) [An Indian name.]

cordifo′lia, (M. w. and y. ♄.) leaves simple, cordate, entire, in threes; flowers in panicles. 40-50 f.

CAULIN″IA. 19—1 (*Aroideæ*, or more properly *Fluviales*.

flex′ilis, (water knot-grass, Au. ⊙.) leaves in sixes, toothed at the apex, spreading. Immersed in ditches. Stem long; flowers small.

CEANO′THUS. 5—1. (*Rhamni.*) [From the Greek *keanothos*.]

america′nus, (New Jersey tea, w. J. ♄.) leaves ovate, acuminate, serrate, 3-nerved pubescent beneath; panicles axillary, long-peduncled, sub-corymbed.

ova′lis, (w. ♄.) leaves oval, with glandular serratures, 3-nerved; nerves pubescent beneath; panicle corymbose, abbreviated. Canada.

mi′crophyl″la, (w. Ju. ♄.) leaves very small, obovate, nearly entire, clustered, glabrous; racemes corymbose, terminal. 1-2 f. *S.*

CELAS″TRUS. 5—1. (*Rhamni.*) [From *kela*, a dart.]

scan″dens, (false bittersweet, staff-tree, y. w. J. ♄.) stem twining; leaves oblong, acuminate, serrate; racemes terminal. Retains its scarlet berries through the winter.

bulla′ta, (w. Ju. ♄.) unarmed; leaves ovate, acute, entire; panicle terminal. 20 f. *S.*

CELO′SIA. 5—1. (*Amaranti.*) [Greek *kelos*, singed, from the appearance of the flowers.]

crista′ta, (cockscomb, r. J.) leaves ovate, acuminate; stipules falcate common peduncle striated; spike oblong, compressed.

CEL″TIS. 5—2. (*Amentaceæ.*)

occidenta′lis, (M. ♄. g-w.) leaves ovate, acuminate, equally serrate, unequal at the base, scabrous above, hairy beneath; flowers small, sub-solitary. Woods. Drupe purple. Nettle tree. Beaver wood.

austra′lis, 20 f.; flowers small; berries black. Lote-tree. Ex.

crassifo′lia, (hag-berry, w. M. ♄.) leaves ovate, acuminate, unequally serrate, unequally cordate at the base, sub-coriaceous; peduncles about 2-flowered. 20 f.

CENOMY′CE. 21—5. (*Algæ.*)

pyxada′ta, frond foliaceous; divisions crenulate, ascending; peduncles all turbinate, cup-form, glabrous, at length warty-granulate, scabrous, greenish-gray; cups regular, afterward the margin is extended and proliferous; receptacles tawny.

coccife′ra, frond foliaceous, minute; divisions round, crenate, naked beneath; peduncles long-turbinate, naked, warty-scabrous, pale yellowish, cinereous and green, all bearing cups, which are wine-glass form; margin extended, fertile; receptacles rather large, at length roundish, scarlet.

CENTAU″REA. 17—3. (*Cinarocephalæ.*; [From *Chiron*, the *centaur*, who is said to have cured a wound in his foot with the plant.]

cya′nus, (great blue-bottle, b. w. r. J. ⊙.) scales of the calyx serrate; leaves linear, entire, lower ones toothed. Naturalized.

america′na, (great American centaury, ⊙.) stem branching; leaves sessile, lower ones oblong-ovate, upper ones lanceolate acute; peduncles thick at the apex. 2 f.

benedic″ta, (blessed thistle, y. J. ⊙.) scales of the involucre doubly armed with spikes, woolly, bracted; leaves decurrent, toothed, spiny. Ex.

ni'gra, (black knapweed, p. Au. ♃.) lower leaves angular-lyrate, upper ones ovate; scales of the involucre ovate, ciliated with capillary teeth. 2 f. Ex.

scabio'sa, (scabrous centaury, ♃.) leaves pinnatifid, roughish; divisions lanceolate, spreading, acute-pinnatifid at the base; involucre ciliate. Ex.

suaveo'lens, (yellow sultana, ☉.) leaves lyrate-pinnatifid; involucre smooth. Ex.

moscha'ta, (sweet sultana, ☉.) leaves slightly pinnatifid; lower divisions mostly entire; involucre smooth. Ex.

CENTAUREL″LA. 4—1. (*Gentianeæ.*)

panicula'ta, (Sept. ☉.) stem branched, smooth; peduncles opposite; leaves minute, subulate; flowers in panicles. Damp grounds. Flowers small, greenish-white. 4-8 i.

ver″na, (w. M-r. ☉.) stem simple, few-flowered; corolla thrice as long as the calyx; style as long as the germ. 4-8. *S.*

CEPHALAN″THUS. 4—1. (*Rubaceæ.*) [From *kephale*, head, *anthos*, flower.]

occidenta'lis, (button bush, w. Ju. ♄.) leaves opposite, and in threes, oval, acuminate; inflorescence a round head. Swamps. Var. *pubes″cens*, has the leaves and the branchlets pubescent. 4-5 f.

CERATIO'LA. 20—2. (*Euphorbeæ.*)

ericoi'des, (Au. ♄.) branchlets sub-tomentose; leaves whorled, narrow, linear, smooth. An evergreen shrub. 4-6 f.

CERAN″THERA. 13—1. (*Labiateæ.*) [From *keras*, horn, and *anthos*, flower; anthers bearing horns.]

linearifo'lia, leaves opposite, linear, sometimes clustered; stem glabrous, branching; racemes terminal; peduncles opposite. 12 i.

CERAS″TIUM. 10—5. (*Caryophylleæ.*) [From *keras*, horn, alluding to the form of its capsule.]

vulga'tum, (mouse-ear, chickweed, w. Ap. ☉.) hirsute, viscid, cespitose; leaves ovate; petals oblong, about equal to the calyx; flowers longer than the peduncle. 6-10 i.

visco'sum, (sticky chickweed, w. J. ☉.) hairy and viscid, spreading; leaves oblong-lanceolate; flowers somewhat panicled, shorter than the pedicels. 4-6 i.

nu'tans, (w. J. ☉.) viscid and elongated; stems erect, deeply striate; leaves elongated, distant, linear-oblong, acute; petals oblong, bifid at the tip, longer than the calyx; peduncles much longer than the flowers. 6-12 i.

oblongifo'lium, (w. J. ♃.) cespitose; pubescent; stem erect, terete even; leaves lanceolate-oblong, rather acute, shorter than the joints; flowers terminal, shorter than the pedicels; petals obovate, bifid at the tip, twice the length of the calyx. 6-12 i.

CERAS″US. (*See Pru'nus.*)

CERATOPHYL″LUM. 19—12. (*Onagræ.*) [Named from the horned divisions of the leaves.]

demer″sum, (hornwort, Ju. ♃.) fruit armed with 3 spines; stem long, slender; leaves verticillate in 8; flowers axillary, solitary very minute.

submer″sum, (♃.) leaves dichotomous in three pairs; fruit without spines. In water

CER″CIS. 10—1. (*Leguminosæ.*)

canaden″sis, (red-bud, judas-tree, r. M. ♄.) leaves round heart-form, acuminate, villose at the axils of the nerves; stipules minute; legumes short-stiped. Var. *pubes″cens*, has roundish, acute leaves, pubescent beneath. 15-30 f.

CETRA'RIA. 21—5. (*Algæ.*) [From *cetra*, a buckler.]

island″ica, (the Iceland lichen, Iceland moss,) frond olive-chestnut-brown, at the base reddish-white, white beneath; divisions erectish, sub-linear, many-cleft, channelled, tooth-ciliate, the fertile ones dilated receptacles close-pressed, flat, 1-colored; margin frond-like, elevated, entire. On sandy plains, as on the barren plains near Beaver pond, in New Haven, where it covers the earth very densely in many places

CHAMÆ'ROPS. 6—3. (*Palmæ.*) [From *chamai*, on the ground, *ops*, appearing.]

serrula'ta, (E. Ju. ♄.) caudex creeping; stipes sharply serrate; fronds plaited, palmate. Fronds 2 f. *S.*

palmet″to, (Ju. ♄.) caudex arborescent; stipes unarmed; spathes doubled; fronds plaited, palmate; fronds 5-6 f. Florida.

CHA'RA. 19—1. (*Naiades.*) [From *chairo*, to rejoice, because it delights in water.]

vulga'ris, (feather-beds, Ju. ☉.) stem and branches naked at the base; branches terete, the joints leafy; leaves oblong, subulate; bracts shorter than the berry. Grows in ponds and ditches.

flex″ilis, (Au. ☉.) stem translucent, naked; branchlets jointless, leafless, compressed; berries lateral, naked.

CHEIRAN″THUS. 14—2. (*Cruciferæ.*) [From *cheir*, hand, *anthos*, flower, the blossoms resembling the fingers.]

chei'ri, (wall-flower, J. ♃.) leaves lanceolate, acute, glabrous; branches angled stem somewhat of a woody texture. Ex.

an″nuus, (stock july-flower, Ju. ☉.) leaves lanceolate, sub-dentate, obtuse, hoary; silique cylindric, with an acute apex. Ex.

pallas″ii, (r. Ju. ♂.) stem simple, terete, somewhat glabrous; leaves glabrous, lanceolate-linear, tapering, repand-toothed.

inca'nus, (brompton stock, ♂.) leaves lanceolate, entire, obtuse, hoary, silique truncate, compressed at apex. Stem somewhat of a woody texture. Ex.

CHELIDO'NIUM. 12—1. (*Papaveraceæ.*) [From *chelidon*, a swallow, because it blossoms about the time this bird appears.]

ma'jus, (celandine, y. M. ♃.) umbels axillary, peduncled; leaves alternate, pinnate, lobed. Naturalized.

CHELO'NE. 13—2 (*Bignoniæ.*) [From *chelone*, a tortoise.]

gla'bra, (snake-head, w. and r. Ju. ♃.) leaves opposite, lance-oblong, acuminate, serrate; spikes terminal, dense-flowered. Var. *al″ba*, leaves sub-sessile; flowers white. Var. *purpu'rea*, leaves short-petioled; flowers purple. Var. *lanceola'ta*, leaves lanceolate, acuminate, serrate, sessile pubescent beneath; segments of the calyx oblong. Damp.

lyo'ni, (p. Au. ♃.) glabrous, branching; leaves petioled, cordate-ovate, serrate; spikes terminal; flowers clustered. *S.*

CHENOPO'DIUM. 5—2. (*Atriplices.* [From *chen*, a goose, and *podos*, foot, so called from its supposed resemblance to a goose's foot.]

al''bum, (green pigweed, g. Ju. ☉.) leaves rhomboid-ovate, erose, entire behind, the upper ones oblong, entire; seed smooth. Var. *vir''ide*, leaves lance-rhomboid, sinuate-toothed; racemes ramose, sub-foliaceous; stem very green. 2-4 f.

bo'trys, (oak-of-Jerusalem, g. J. ☉.) leaves oblong, sinuate; racemes naked, many-cleft. Sweet-scented. 12 i.

ru'brum, (red pigweed, r-g. Ju. ☉.) leaves rhomboid-triangular, deeply toothed and sinuate; racemes erect, compound, leafy. 2-3 f.

ambrosioi'des, (sweet pigweed, g. Ju. ☉.) leaves lanceolate, remotely toothed; flowers in interrupted sessile clusters; on slender, axillary, leafy branches. 1-2 f.

anthelmin''ticum, (wormseed, g. Au. ♃.) leaves oblong-lanceolate, toothed; spikes long, interrupted, leafless; odor strong. 12-24 i.

scopa'rium, (summer cypress,) leaves flat, lance-linear, margin ciliate; flowers glomerate, axillary. Ex.

CHIMAPH''ILA. 10—1. (*Ericæ.*) [From *cheima*, winter, and *philos*, a lover.]

macula'ta, (spotted wintergreen, w. Ju. ♃.) leaves lanceolate, rounded at the base, remotely serrate, marked with long spots; scape 2-3-flowered; filaments woolly.

umbella'ta, (prince's pine, bitter wintergreen, r. w. Ju. ♃.) leaves serrate, uniformly green, wedge-lanceolate, with an acute base; scape corymbed; filaments glabrous.

CHIOCOC''CA. 5—1. (*Rubiaceæ.*) [From *Chion*, snow, *kokkos*, berry.]

racemo'sa, (y. w. Ju. ♄.) leaves ovate, oblong, acute, flat; racemes axillary, peduncled, simple. *S.*

CHIONAN''THUS. 2—1. (*Jasmineæ.*) [From *chion*, snow, *anthos*, flower.]

virgin''ica, (fringe-tree, w. M. ♄.) panicle terminal, trifid; peduncles 3-flowered; leaves acute. Var. *monta'nus*, leaves oval-lanceolate, coriaceous, glabrous; panicle dense; drupe oval. Var. *mariti'mus*, leaves obovate-lanceolate, membranaceous, pubescent; panicle very lax; drupe elliptic; berries purplish-blue.

CHONDRIL''LA. 17—1. (*Chioraceæ.*)

carolinia'na, (y. March, ♃.) leaves lance-oblong, glabrous; stem erect, few-flowered, peduncles long. 2 f.

CHRYSAN''THEMUM. 17—2. (*Corymbiferæ.*) [From *chrusos*, golden, *anthos*, flower.]

parthe'nium, leaves petioled, compound, flat; leafets ovate, gashed; peduncles branching, corymbed; stem erect. Feverfew. Ex.

carina'tum, (r. w. Au. ☉.) leaves bipinnate, fleshy, glabrous; scale of the calyx carinate. Three-colored daisy. Ex.

corona'rium, (Au. ☉.) leaves bipinnatifid, acute broader outward; stem branching. Garden chrysanthemum, improperly called artemisia. Ex.

leucan''themum, (ox-eyed daisy, J. ♃) leaves clasping, lanceolate, serrate, cut-toothed at the base; stem erect, branching 12-20 i.

CHRYSEIS. 12—1. (*Papaveraceæ.*)

califor''nica, (y.) stem branching, leafy; torus obconic; calyx ovoid, with a very short abrupt acumination; petals bright yellow, with an orange spot at the base *S.* Oregon.

CHRYSOBALA'NAS. 11—1. (*Rosaceæ.*) [From *chrusos*, gold, *balanus*, a nut, so called on account of the yellow color of the nut before it is dried.]

oblongifo'lius, (w. J. ♄.) leaves oblong, lanceolate, entire, glabrous, shining; flowers panicled; fruit oblong. 1-2 f. *S.*

CHRYSOCO'MA. 17—1. (*Corymbiferæ.*) [From *chrusos*, gold, *kome*, hair.]

virga'ta, herbaceous, smooth; leaves narrow, linear; stem branching; branches corymbed, fastigiate, virgate; scales of the calyx glutinous, appressed. 18 i. Golden locks. Flowers yellow.

nuda'ta, (y. S. ♃.) radical leaves spatulate, lanceolate; cauline ones linear, scattered; corymb compound, fastigiate; involucre oblong, 3-4-flowered. 2 f. *S.*

CHRY''SOGO'NUM. 17—4. (*Corymbiferæ.*)

virginia'num, (y. J. ♃.) low, woolly, villose; leaves oval-dentate, narrowing into the petiole. 6-12 i. *S.*

CHRYSOP''SIS. 17—2. (*Corymbiferæ.*) [From *chrusus*, golden, *ops*, appearance.]

maria'na, (y. Au. ♃.) hairy; leaves oblong-lanceolate, serrate; the upper ones sessile, acute; the lower ones spatulate, and generally obtuse; corymb simple; involucre viscid-pubescent. Florets of the ray 16-20. Sandy woods.

graminifo'lia, (y. S. ♃.) silky, leaves lanceolate-linear, acute, entire, nerved; corymb compound; stem leafy toward the summit. Var. *tenuifo'lia.* Silky or woolly leaves, narrow-linear, shining; stem few-flowered; scales of the involucre glabrous 2 f.

pinifo'lia, (y. Oc. ♃.) very glabrous; stem rigid; leaves linear, crowded, rigid; corymb large; scales of the involucre woolly at the summit. 18-24 i. *S.*

tri'chophyl''la, (y. Au. ♃.) hairy, leaves oblong, obtuse, very entire, somewhat clasping, scabrous on the margin; corymb simple; scales of the involucre very narrow, glandular. 12-18 i. *S.*

gossyp''ina, (y. S. ♃.) woolly, hoary, leaves sessile, oblong, spatulate, obtuse, very entire; corymb fastigiate. 1-2 f. *S*

denta'ta, (y. S. ♃.) lanuginous; leaves cuneate, obtuse, deeply toothed; upper ones oblong, oval, entire; corymb simple. 2 f. *S.*

CHRYSOSPLE'NIUM. 8—2. (*Saxifragæ.*) [From *chrusos*, gold, *asplenion*, spleenwort.]

oppositifo'lium, (golden saxifrage, y-r. M. ♃.) leaves opposite, roundish, slightly crenate, tapering for a little distance to the petiole. In rivulets, springs, &c.

CI′CER. 16 -10. *Leguminosæ.*) [From *cicer*, vetch.]

arieti′num, (☉.) peduncle 1-flowered; seeds globose; leaves serrate. Chickpea.

CICHO′RIUM. 17—1. (*Chicoraceæ.*) [An Egyptian name, signifying creeping.]

in″tybus, (succory or endive, b. Ju. ♃.) flowers axillary, in pairs, sessile; leaves runcinate.

endiv″ia, (garden endive, b. Ju. ♂.) peduncles axillary in pairs; one long, 1-flowered, the other short, about 4-flowered; leaves oblong, denticulate. Var. *cris″pum*, has fringed leaves and solitary flowers. Ex.

CICU′TA. 5—2. (*Umbelliferæ.*) [From *cæcuta*, blind, because it destroys the sight of those who use it.]

macula′ta, (w. Ju. ♃.) serratures of the leaves mucronate; petioles membranaceous, 2-lobed at the apex. Damp. 3-6 f. Cow-bane.

bulbife′ra, (w. Au. ♃.) leaves ternate and biternate; bulbiferous; leafets linear and linear-lanceolate, remotely toothed. Wet. 2-3 f.

viro′sa, (water hemlock, ♃.) umbels opposite to the leaves; petioles margined; obtuse; leafets ternate, acutely serrate. Root containing a yellow juice. Ex.

CIMCIFU′GA. See ACTÆ′A, MACRO′TRYS.

CINERA′RIA. 17—2. (*Corymbiferæ.*) [From a Latin word, signifying ashes, from the appearance of the leaves.]

heterophyl″la, (ash-wort, y. M. ♃.) downy; radical leaves long-petioled, obovate-spatulate, also ovate, acutish and pinnatifid; cauline ones 2-3, linear, pinnatifid; flowers corymbed. 8 i.

CIRCÆ′A. 2—1. (*Onagræ.*) [From *Circe*, the enchantress.]

lutetia′na, (Aug. r-w. ♃.) stem erect; leaves ovate, remotely toothed, opaque, nearly smooth. 1-2 f. Enchanter's nightshade.

alpi′na, (r-w. Au. ♃.) stem branched, glabrous, often procumbent; leaves broad-cordate, membranaceous, acutely toothed, shining. 6-8 i.

CIS″TUS. 12—1. (*Cisti.*)

canaden″sis, (rock-rose, y. J. ♃.) without stipules, erect; leaves alternate, erect, linear-lanceolate, flat, tomentose beneath; racemes terminal, few-flowered; divisions of the calyx ovate-acuminate; capsules shorter than the calyx. 6-14 i.

cre′ticus, leaves spatulate-ovate; scales of the calyx lanceolate. Candia, where the juice of the plant is collected and sold under the name of *lada′num*.

corymbo′sum, (J. ♃.) without stipules, erect, ramose, minutely pubescent; leaves alternate, lanceolate, whitish downy beneath; corymb fastigiate, with numerous crowded flowers; divisions of the calyx ovate, acute; capsule longer than the calyx. 12 i.

carolin″ia′num, (J. ♃.) without stipules, hirsute, erect; leaves alternate, oblong-oval, sub-denticulate; bottom ones obovate, hirsute on both sides; peduncles few, terminal with the calyx very villose; divisions of the calyx oblong, acute, shorter than the petals. *S.*

polifo′lium, (Ju. Au.) primary or petaliferous flowers terminating the stem, and the numerous short branches on filiform peduncles, many times longer than the flower, the broadly-cuneiform petals a little exceeding the calyx; secondary flowers very small, apetalous, 3 to 6 androus, clustered in lateral cymules on the foliferous branches, at first glomerate and nearly sessile, at length on pedicels as long as the calyx, leaves linear, or linear-oblong, with revolute margins; beneath tomentose-caulescent. *S.*

CIT″RUS. 12—1. (*Auranti æ.*) [The Latin name for lemon.]

me′dica, (lemon-tree, w. J. ♄.) leaves ovate, acuminate, with linear, wingless petioles. Var. *li′mon* (lime-tree), bears smaller fruit, which is almost round. 4-10 f Ex.

auran″tium, (orange-tree, w. ♄.) leaves oval, acuminate, with the petioles winged or margined. Ex.

limel″la, yields burgamot. Ex.

limo′num, yields citric acid. Ex.

CLARK″IA. 8—1. (*Onagræ.*)

pulchel″la, (r-p. J. ♂.) stem erect, terete leaves alternate-linear, entire, glabrous, flower sub-sessile, large. 12-18 i. Cultivated. Beautiful Clarkia.

CLAYTO′NIA. 5—1. (*Portulacceæ.*) [In honor of Dr. John Clayton.]

virgin″ica, (w. r. A. ♃.) leaves linear lanceolate; petals obovate, retuse; leaves of the calyx somewhat acute; root tuberous. Var. *latifo′lia*, leaves ovate-lanceolate; leaves of the calyx obtuse. 6-12 i. Spring-beauty.

carolin″ia′na, (Ap.) leaves ovate-lanceolate or oval, sub-spatulate at the base or abruptly decurrent into a petiole; radical leaves very few, spatulate; pedicels slender, nodding; sepals and petals very obtuse Canada to Carolina.

CLEMA′TIS. 12—12. (*Ranunculaceæ.*) [From *klema*, a tendril.]

virgin″ica, (virgin's bower, w. Ju. ♄.) climbing; leaves ternate; leafets ovate, sub-cordate, gash-toothed and lobate; flowers panicled, diœcious. 12-20 f.

ochroleu′ca, (w. y. J. ♃.) erect, simple, pubescent; leaves simple, ovate, entire young leaves and calyx silky; flower terminal, peduncled, solitary, nodding. 12 i.

vital″ba, (traveller's-joy, w. Au.) leaves pinnate; flowers in clusters; seeds plumose. Ex.

vior″na, (blue Virginian climber, J. ♄.) climbing leaves pinnately divided; leafets lance-ovate, entire, acute at both ends, 3 lobed; peduncles 1-flowered; petals thick acuminate, reflexed at the apex. *S.*

flam″mula, (sweet virgin's bower, ♄.) lower leaves laciniate; upper ones simple, entire, lanceolate. Ex.

viticel″la, (purple virgin's bower, p. Ju. ♃.) climbing leaves compound and decompound; leafets oval, sub-lobate, entire petals obovate, spreading. Ex.

holoseri'cea, (w. ♄.) climbing, leaves divided, ternate; segments oblong-lanceolate, entire, pubescent on both sides; corymbs trichotomous, few-flowered, diœcious; petals linear, longer than the stamens. Whole plant silky. *S.*

cylin'drica, (p-b. Ju. ♄.) climbing; leaves pinnate, decompound; leafets ovate, acute at each end, glabrous, simple, petioled; peduncles terminal, solitary; corolla nodding, cylindrical; petals coriaceous; awns of the carpels plumose. *S.*

reticula'ta, (p-r. Ju. ♄.) climbing; leaves pinnate in 4 pairs; leafets ovate, obtuse at each end, all entire, petioled, membranaceous, reticulately nerved on both sides; flowers solitary, petals coriaceous; awns of the carpels plumose. *S.*

linearilo'ba, peduncles 1-flowered; petals very acute; leaves divided, pinnate glabrous; leafets entire or 3-parted. *S.*

CLEO'ME. 6—1. (*Capparides.*)

dodecan''dra, (r. w. Ju. ☉.) viscid-pubescent; leaves ternate; leafets elliptical oblong; flowers generally dodecandrous. 1 f.

serula'ta, (p-w. Au. ☉.) glabrous; leaves ternate; leafets lanceolate, obsoletely serrulate; raceme elongated; bracts linear; stamens 6. 3-4 f. *S.*

CLE'THRA. 10—1. (*Ericæ.*)

alnifo'lia, (w. Au. ♄.) leaves wedge-obovate, acute, coarse-serrate, glabrous, both sides one color; racemes spiked, simple, bracted, hoary-tomentose. 4-8 f. Sweet pepper-bush.

tomento'sa, (w. Au. ♄.) leaves cuneate-obovate, acute, sub-serrate, white-tomentose beneath; racemes spiked, simple, bracted; villose tomentose. 2-4. f. *S.*

sca'bra, (w. Ju. ♄.) leaves broad-wedge-obovate, acute, coarse-serrate, scabrous on both sides, serratures uncinate; racemes spiked, sub-panicled, bracted, sub-tomentose. *S.*

panicula'ta, (w. Ju. ♄.) leaves narrow-wedge-lanceolate, glabrous on both sides, acute, serrate; serratures acuminate; panicle terminal, racemose, white-tomentose. *S.*

acumina'ta, (w. Au. ♄.) leaves oval, acuminate, serrate, glabrous on both sides, glaucous beneath; racemes spiked, bracted, white-tomentose. *S.*

CLINIPO'DIUM. 13—1. (*Labiatæ.*)

vulga're, (field thyme, r. p. Ju. ♃.) flowers in head-form whorls; bracts setaceous, hispid; stem simple. Rocky woods.

CLINTO'NIA. 6—1. (*Campanulaceæ.*) [Named in honor of Gov. De Witt Clinton.]

multiflo'ra, (M. ♄.) leaves radical, oblong-oval, with the margin and keel ciliate; scape pubescent; umbel terminal; pedicels with minute bracts at base. Referred by some to CONVALLA'RIA.

CNI'CUS. 17—1. (*Cinarocephalæ.*) [From *knao*, to scratch.]

lanceola'tus, (common thistle, p. J. ♂.) leaves decurrent, hispid, pinnatifid; divisions 2-lobed, divaricate, spinose; calyx ovate, with spider-web-like pubescence; scales lanceolate, spinose, spreading. 2-4 f.

arven''sis (Canada thistle, p. J ♃.) leaves sessile, pinnatifid, ciliate, spinose; stem panicled; calyx ovate, mucronate; scales broad-lanceolate, close-pressed; margin woolly. 2-3 f.

altis''simus, (tall thistle, w. p. Au. ♃.) leaves sessile, lance-oblong, scabrous, downy beneath, toothed, ciliate, radical ones pinnatifid; involucre bracted, ovate, scales lance-ovate, spinose, close-pressed 3-8 f.

horrid''ulus, (w-y. Ju. ♂.) tall; leaves sessile, pinnatifid, acutely gashed, very spinose; bracts terminal, 1-flowered, many-leaved; leafets very spinose, spines in pairs; involucre unarmed. 2-3 f.

virginia'nus, (p. J. ♃.) stem simple; leaves sessile, lanceolate, hoary-tomentose beneath, remotely toothed, teeth spinous; flowers solitary; involucre globose, scales mucronate, appressed, carinate. 3-5 f.

odora'tus, (r. Ju. ♂.) woolly; stem 1 to 3-flowered; leaves clasping, lance-oblong, pinnatifid; segments irregularly lobed, ciliate, tipped with spines, color similar on both sides; involucre large, sub-globose, naked; scales close-pressed, lanceolate, acuminate, spinose. 1-2 f.

glutino'sus, (p. Au. ♂.) leaves pinnatifid, segments divaricate; involucre ovate; scales unarmed, glutinous. 4-6 f.

CNID''IUM. 5—2. (*Umbelliferæ.*)

canaden''se, (w. Ju. ♃.) stem angular, flexuous; leaves bipinnate, shining, leafets many-parted; segments lanceolate; involucrum many-leaved. Banks of streams.

atropurpu'reum, (p. J. ♃.) radical leaves sub-cordate, simple, serrate, cauline ones ternate; leafets ovate, acute, sub-cordate, middle one petioled; partial involucre dimidiate, 3-leaved. 2-3 f.

COCHLEA'RIA. 14—1. (*Cruciferæ.*) [From *cochleare*, a spoon.]

armora'cia, (horse-radish, w. J. ♃.) radical leaves lanceolate, crenate, cauline ones gashed. Naturalized. Ex.

officina'lis, (scurvy-grass,) radical leaves roundish, cauline ones oblong, sub-pinnate; silicles globose.

CO'COS. 19—6. (*Palmæ.*) [From the Portuguese *coquen*, monkey, the three holes at the end of the cocoa-nut shell giving it the appearance of a monkey's head.]

nucif''era, stem erect, vertical, crowned with long, pinnate leaves. Cocoa-nut. E. and W. Indies. The species *butyra'cea* affords the palm-oil.

CO'IX. 19—3. (*Gramineæ.*) [From *koix*, a palm-leaved tree.]

lach''ryma, (Job's tear, Ju. ☉.) culm semi-terete above; flowers naked; fruit ovate.

COLLIN''SIA. 13—2. (*Scrophulariæ.*) [In honor of Zaccheus Collins, of Philadelphia.]

ver''na, (b. M. ☉.) leaves opposite, ovate-oblong, sessile, obtuse, the lower ones with a long petiole; peduncles long, axillary, 1-flowered. Banks of streams.

COLLINSO'NIA. 2—1. (*Labiatæ.*)

canaden''sis, (y. Au. ♃.) leaves broad-cordate, ovate, glabrous; teeth of the calyx short, subulate; panicle terminal, compound. Woods. 2 3 f *sca'bra*, (r-y Au ♃.) leaves small, ovate, sub-cordate, somewhat hairy; teeth of the calyx short, subulate; panicle terminal, simple; stem hairy, rough. 2-3 f. *S.*

ova'lis, (y. Au. ♃.) leaves oblong-oval, acute at each end, glabrous; petioles long; teeth of the calyx short; panicle terminal, simple, naked; stem glabrous. *S.*

tubero'sa, (y. S. ♃.) leaves somewhat rhomboid-oval, acute at each end, glabrous; teeth of the calyx setaceous, longer than the tube; panicle compound, leafy; stem branching, somewhat hairy. 3-4 f. *S.*

anisa'ta, (y. Au. ♃.) leaves ovate, cordate, rugose, glabrous; nerves pubescent beneath; teeth of the calyx linear, nearly as long as the tube; panicle leafy, compound, pubescent; flowers tetrandrous; stem branching, pubescent. *S.*

puncta'ta, (y. S. ♃.) leaves ovate-lanceolate, acuminate, acute at the base, pubescent and dotted beneath; panicle compound. 2-6 f.

verticilla'ta, (M.) leaves verticillate, oval, and acuminate. Var. *purpuras''cens*, flowers purplish; panicle short. 1 f. *S.*

COLU'TEA. 16—10. (*Leguminosæ.*)

vesica'ria, (senna-herb, y. Ju.) leaves pinnate, leafets ovate; stem herbaceous, decumbent, villose; legumes orbicular, inflated.

COMMELI'NA. 3—1. (*Junci.*) [In honor of Commelins, a family of Amsterdam, who advanced the science of botany in the seventeenth century.]

angustifo'lia, (day-flower, b. Ju. ♃.) assurgent, weak, somewhat glabrous; leaves lance-linear, very acute, flat, glabrous; sheaths sub-ciliate; bracts (or involucres) peduncled, solitary, short-cordate. 12 i.

virgini'ca, (b. Ju. ♃.) stiffly erect, all over pubescent; leaves long, lanceolate; sheaths red-bearded at the throat; bracts (or involucres) sub-sessile, lateral, and terminal; calyx petal-like, 3-leaved, nearly equal. 2 f.

cœles''tis, resembles, in most particulars the preceding species; the leaves are sheathing, broad at the base, rough on the edges. The flower is of a beautiful light blue, concealed by the foliaceous sheath before blossoming. Mexico. Blue commelina of the florists.

commu'nis, (b. Au. O.) corolla unequal; leaves ovate, lanceolate, acute; stem creeping, glabrous. *S.*

COMPTO'NIA. 19—3. (*Amentaceæ.*) [Lord Compton.]

asplenifo'lia, (sweet-fern, g. Ap. ♄.) leaves long-linear, alternately crenate-pinnatifid. 18-48 i.

CONFER''VA 21—4 (*Algæ.*) [From *conferveo*, to knit together, so named from its supposed use in healing broken bones.]

ru'fa, threads ramose, capillary, straight, obsoletely geniculate; branches and branchlets opposite, remotish; length of the joints equalling the diameter. In the sea. Reddish yellow, shining, in fascicles; threads of the thickness of human hair, 2 inches and longer, flaccid, soft.

CO'NIUM. 5—2. (*Umbelliferæ.*) [From *konao*, poisonous.]

macula'tum, (poison hemlock, w. Ju. ♃.) stem very branching, spotted; leaves very compound; seed striate. Var. *crispat''ulum*, leaves crisped; ultimate divisions acuminate, or terminated in a bristle. 2-4 f.

CONRAD''IA. 13—2. (*Nyctagines.*) [Named after S. W Conrad, Prof. Bot. Un. Phil.]

fuschsioi'des (♃.) glabrous; calyx foliaceous, divisions exsert, denticulate; leaves petioled, lanceolate, lyre-pinnatifid, lobes denticulate outside. 4 f. Resembles gerardia quercifolia.

CONVALLA'RIA. 6—1. (*Asparagi.*) [From the Latin *convallis*, a valley, its usual place of growth.]

1. *Corolla deeply* 4-*parted, spreading; stamens* 4; *berry* 2-*celled.*
(Flowers in a terminal raceme.)

bifo'lia, (dwarf solomon seal, w. J. ♃.) stem with two heart-oblong, sub-sessile, glabrous leaves; raceme simple, terminal; flowers tetrandrous. Var. *trifo'lia*, stem 3-leaved. 4-6 i.

2. *Corolla* 6-*parted, spreading; filaments divergent, attached to the base of the segments.*
(Flowers in a terminal raceme.)

stella'ta, (w. M. ♃.) stem with alternate, clasping, oval-lanceolate leaves; raceme simple, terminal. 8-18 i.

trifo'lia, (w. J. ♃.) stem about 3-leaved; leaves alternate, ovate-lanceolate, contracted at the base; raceme simple, terminal, few-flowered. 6-10 i.

cilia'ta, (w. ♃.) stem arched; leaves alternate, sessile, ovate, ciliate; panicle terminal, crowded.

racemo'sa, (spiked solomon's seal, y-w. M. ♃.) stem with alternate leaves; leaves sessile, oblong-oval, acuminate, nerved, pubescent; flowers in a terminal raceme-panicle. 18-24 i.

3. *Corolla sub-campanulate, deeply* 6-*parted; style elongated; berry* 2-*celled, many-seeded.*

borea'lis, (wild lily of the valley, dragoness plant, g. y. J. ♃.) sub-caulescent; leaves oval-obovate, margin ciliate; scape pubescent; umbel few-flowered, sub-corymbed, sometimes proliferous; pedicels naked, nodding. 6-10 i.

umbella'ta, (w. Ju. ♃.) leaves radical, oblong-ovate, with the margin and keel ciliate, scape pubescent; umbel terminal; pedicels bracteate. 8-12.

4. *Corolla* 6-*cleft, cylindric; filaments inserted on the upper part of the tube. berry* 3-*celled; cells* 2-*seeded.*
(Flowers axillary.)

multiflo'ra, (giant solomon's seal, w. Ju ♃.) stem terete; leaves alternate, clasping oblong-ovate; peduncles axillary, some of them many-flowered. 2-3 f.

biflo'ra, (g-y. J. ♃.) stem terete, smooth, leaves alternate, sessile, elliptic-lanceolate, 3-nerved; peduncles axillary, solitary, few flowered. 12-18 i.

pubes''cens, (w. M. ♃.) stem teretish, furrowed; leaves alternate, clasping-ovate pubescent beneath; peduncles axillary about 2-flowered. 18 i.

canalic''ula'ta, (clasping solomon's seal, w. Ju. ♃.) stem channeled; leaves alternate, clasping, oblong, margin pubescent; peduncles axillary, about 2-flowered.

latifo'lia, (Ju. ♃.) stem angled; leaves sessile, ovate, acuminate; peduncles one, or many-flowered. 4 f.

hir''ta, (♃.) stem angular, hispid; leaves alternate, somewhat clasping, ovate, abruptly acuminate; peduncles axillary, 3-flowered.

maja'lis, (lily of the valley, w. J. ♃.) scape naked, smooth; leaves oval-ovate. *S.* Cultivated.

CONVOL''VULUS. 5—1. (*Convolvuli.*) [From *convolvo*, to intwine.]

re'pens, (field bind-weed, w. and r. J. ♃.) twining; leaves sagittate, with the apex acute and the lobes truncate, entire, (some obtuse): bracts acute, longer than the calyx, and shorter than the middle of the corolla; peduncle angled, exceeding the petiole.

pandura'tus, (mechoacan, w. and. r. Ju. ♃.) twining, pubescent; leaves broad-cordate, entire or lobed, guitar-form; peduncles long; flowers fascicled; calyx glabrous, awnless; corolla tubular bell-form. Resembles rhubarb in its effects.

stans, (w. J. ♃.) erect; leaves oval or oblong, sub-cordate, pubescent: peduncles 1-flowered, generally longer than the leaves. 9-12 i.

arven''sis, (bind-weed, w. J. ♃.) stem climbing or prostrate; leaves sagittate; lobes acute, spreading; peduncles about 1-flowered; bracts minute, acute.

spitha'meus, (dwarf morning glory, w. J. ♃.) erect; leaves oval, or oblong, sub-cordate, pubescent; peduncles 1-flowered, generally longer than the leaves. 9-12 i.

tri'color, (3-colored bind-weed, Ju. ☉.) leaves lance-ovate, glabrous; stem declined; flowers solitary. Ex.

jala'pa, leaves ovate, sub cordate, obtuse, villose. South America. The root affords the jalap of commerce.

bata'tus, (sweet potato, Carolina potato, w-r. Ju. ♃.) creeping, tuberous; leaves cordate, hastate, angular-lobed, 5-nerved, smoothish; peduncles long; flowers fascicled; corolla sub-campanulate. Cultivated.

purpu'reus, (common morning-glory, b. p. J. ☉.) pubescent; leaves cordate, entire; peduncles 2 to 5-flowered; pedicels nodding, thickened; divisions of the calyx lanceolate; capsules glabrous. Cultivated.

CONY'ZA. 17—2. (*Corymbiferæ.*) [From *Konis*, dust, or *konops*, a gnat; the powder destroys fleas.]

camphora'ta, or *marylan''dica*, (plowman's wort, p. Au. ♃.) herbaceous, slightly pubescent; leaves on petioles, ovate-lanceolate, very acute, denticulate; corymbs terminal, shorter than the leaves; scales of the involucre acute, as long as the florets.

COP''TIS. 12—12. (*Ranunculaceæ.*)

trifo'lia, (gold thread, w. M. ♃.) scape 1-flowered; leaves ternate; roots long, filiform, golden yellow; very bitter. 2-4 i.

asplenifo'lia, (♃.) leaves biternate, leafets ub-pinnatifid scape 2-flowered

occiden''talis, (false gold-thread, y. ♃.) evergreen; leaves gash 3-lobed, or obsoletely 3-leaved, sub-coriaceous; scape very short, about 3-flowered.

CORALLORHI'ZA. 18—1. (*Orchideæ.*) [From *korallion*, coral, and *riza*, root.]

odontorhi'za, (coral-teeth, p. w. Ju. ♃.) lip entire, oval, obtuse, margin crenate, spur obsolete, adnate to the germ; capsule sub-globose. 12 i.

ver''na, (coral-root, w. y. M ♃.) petals linear-lanceolate, spreading: lip oblong, without spots, bidentate at the base, apex recurved, ovate; spur obsolete, adnate. 5-6 i.

multiflo'ra, (p. Ju.) scape many-flowered (15-30), lip cuneate-oval, 3-parted. recurved, spotted; spur conspicuous, adnate. 12-20 i.

CORCHO'RUS. 12—1. (*Tiliaceæ.*)

siliquo'sus, branching; leaves ovate or lanceolate, acute, equally serrate; capsules pod-shaped, linear, 2-valved, nearly glabrous. Alabama.

COREOP''SIS. 17—3. (*Corymbiferæ.*) [From *koris* insect, *opsis*, resembling.]

tripte'ris, (tickseed sunflower, y. ♃.) glabrous; leaves petioled, lanceolate, entire, radical ones pinnate, cauline ones ternate; rays entire; seeds obovate.

tincto'ria, (elegant coreopsis, y-p.) radical leaves sub-bipinnate, leafets sub-oval, entire, glabrous; cauline ones sub-pinnate, leafets linear; rays 2-colored, seeds naked. 1-4 f. Missouri.

ro'sea, (tickweed, y. r. M.) small, smooth; stem simple; leaves linear, entire, opposite, and undivided; axils leafy; flowers few, long-peduncled, dichotomous, terminal; rays unequally 3-toothed. 1 f.

trichosper''ma, (y. Ju. ♂.) glabrous, dichotomous; leaves opposite, divided, quinate-pinnate, lanceolate-serrate; outer leafets of the involucre ciliate-serrate; rays entire; akenes wedge-form, about 4-toothed 2 f.

dichot''oma, (y. S. ☉.) stem glabrous, nakedish, and dichotomous above; leaves mostly alternate, undivided, entire, narrowing into the petioles; akenes obovate, 2-bristled, scabrous, with a torn margin. 2 f

as''pera, leaves lanceolate-linear, rough upper ones alternate, lower ones opposite stem 1-flowered.

palma'ta, (y.) stem simple, 1-3 flowered; leaves alternate, sessile, sub-coriaceous, palmate, 3-lobed; margin scabrous; double involucre 8-parted; akenes oblong-elliptic, naked 12 i.

lanceola'ta, (y. S. ♃.) leaves opposite, undivided, sessile, lanceolate-linear, entire, ciliate; peduncles long, naked; akenes orbicular, scabrous, winged 2-toothed at the summit, emarginate. *S.*

arista'ta, (y. Au. ♃.) pubescent; leaves opposite, divided, quinate, pinnate, leafets serrate; rays entire, broad, oval; akenes cuneate-obovate, 2-awned; awns long divaricate. *S.*

CORIAN''DRUM. 5—2. (*Umbelliferæ.*) [From *koris*, a bug, probably from its peculiar smell]

sati'vum, (coriander, w. J. ☉.) fruit globose; calyx and style permanent. Ex

CORISPER″MUM. 1—2. (*Atriplices.*) [From *koris*, bug, *sperma*, seed.]

hyssopifo'lium, (Au. ♄.) spikes terminal, leaves unarmed, nerveless, linear. A variety, *america'num*, has spikes axillary; leaves nerved, mucronate.

COR″NUS. 4—1. (*Caprifoliæ.*)

canaden″sis, (dogweed, low cornel, w. M. ♃.) herbaceous; leaves at the top whorled, veiny; involucre ovate, acuminate; fruit globose. 4-8 i.

flori'da, (false-box, w-y. M. ♄.) leaves ovate, acuminate; involucre 4, very large, somewhat obcordate; fruit ovate. 15-30 f.

circina'ta, (w. J. ♄.) branches warty; leaves broad-oval, acuminate, white-downy beneath; cymes depressed. 6-8 f.

seri'cea, (red osier, red rod, w. J. ♄.) branches spreading; branchlets woolly; leaves ovate, acuminate, rounded at the base, rusty-pubescent beneath; cymes depressed, woolly. Var. *nerva'ta*, leaves tapering to the base, unequal, veins beneath very prominent; berries bright blue. 8-12 f.

sanguin″ea, (common dog-wood, w. M. ♄.) branches straight; leaves ovate, pubescent, both sides colored alike; cymes spreading; berries dark-brown; anthers yellow. 8-12 f.

al″ba, (white dog-wood, J. ♄.) branches recurved; branchlets glabrous; leaves ovate, acute, pubescent, hoary beneath; cymes depressed; berries bluish-white. 10 f.

panicula'ta, (bush dog-wood, w. J. ♄.) branches erect; leaves ovate-acuminate, oblong, tapering to the base, pubescence close-pressed, hoary beneath; flowers in a thyrsed cyme; berries white, globular, flattened. 8-12 f.

stric″ta, (w. J. ♄.) branches straight, fastigiate; leaves ovate, color green both sides, glabrous when mature, a little downy beneath when young; panicled cyme convex. 8-12 f.

alternifo'lia, (w. M. ♄.) branches warty; leaves alternate, ovate, acute, hoary beneath, cymes depressed, spreading; berries purple. 18 f.

mas″cula, (cornelian cherry, M. ♄.) umbels equalling the involucre. Ex.

asperifo'lia, (w. J. ♄.) branches erect, pubescent; leaves oval-lanceolate, acuminate, scabrous above, tomentose beneath. 4-10 f. *S.*

CORONIL″LA. 16—10. (*Leguminosæ.*)

va'ria, (r-p. Ju. ♃.) herbaceous, diffuse, glabrous; stipules small, acute; leafets 9 to 13, oblong, mucronate, lower ones of the stem near each other; umbels 16 to 20-flowered; legumes erect. 4 f.

glau'ca, (y. M. ♄.) leafets 7, very blunt; stipules lanceolate; umbels 10 or 12-flowered; peduncles longer than the leaves. Remarkably fragrant during the night, and almost scentless during the day. 3 f.

o'merus, (coronilla, y. ♄.) stem angled; woody; peduncles about 3-flowered; claws of the petals about thrice as long as the calyx. Ex.

CORONO'PUS. 14—1. (*Cruciferæ.*). [From *korone*, a crow, and *pous*, foot; the leaves resemble a bird's foot.]

ruel″lii (w. Ju. ⊙.) silicle entire; margin muricate; style prominent; corymb few flowered. *S.*

didy″ma, (swine's cress, Ju. ⊙.) silicles emarginate, in pairs, reticulate, rugose; style obsolete; corymb many-flowered 1-2 f. Charleston.

CORYDA'LIS. 16—5. (*Corydales.*) [From *korus*, a helmet, alluding to the form of its flowers.]

cuculla'ria, (colic-weed, y. & w. M. ♂.) corolla 2-spurred; scape naked; raceme simple, 1-sided; nectaries divaricate, of the length of the corolla; style enclosed. 8-12 i. This plant is referred by some to DIELYTRA, by others to FUMARIA.

glau'ca, (r-y-g. J. ⊙.) stem erect, branched; leaves glaucous, decompound, segments cuneate, trifid; bracts oblong-acute, shorter than the pedicels; pod linear, flat, scarcely torulose. 1-4 f. *S.* Mch.

au'rea (y. M. ⊙.) stem branched, diffuse; leaves glaucous, doubly pinnate, lobes oblong-linear; bracts linear-lanceolate, acuminate, toothed, longer than the pedicels; pod terete, torulose. 8-12 i.

CORY″LUS. 19—12. (*Amentaceæ.*) [From *karua*, a nut.]

america'na, (hazel-nut, Ap. ♄.) leaves roundish, cordate, acuminate; calyx roundish-campanulate, larger than the sub-globose nut; border dilated, coarsely serrate 3-5 f.

rostra'ta, (beaked hazel, Ap. ♄.) leaves oblong-ovate, acuminate; stipules lance linear; involucre of the fruit bell-tubular, 2-parted; divisions gash-toothed, elongated beyond the nut into a beak. 2-3 f.

avella'na, (filbert, Ap. ♄.) stipules oblong, obtuse; involucre of the fruit campanulate, spreading at the apex, torn-toothed; leaves round-cordate, acuminate. Var. *max″ima*, has a gash-toothed involucre; nut depressed ovate. Ex.

CRAM″BE. 14—1. (*Cruciferæ.*) [A name given by Dioscorides to cabbage.]

mara'tima, (sea-kale, w. ♄.) stem foliaceous, smooth; leaf sinuate, glaucous; flowers corymbed, panicled.

CRANI'CHIS. 18—1. (*Orchideæ.*)

multiflo'ra, root fascicled, villose; leaves oval-lanceolate, sub-sessile; scape many-flowered, pubescent toward the summit; inner petals connivent; lip vaulted, acuminate.

CRATÆ'GUS. 11—5. (*Rosaceæ.*) [From *kratus*, strength, from the toughness of its wood.]

coccin″ea, (thorn-bush, w. M. ♄.) thorny; leaves long-petioled, ovate, acutely lobed, serrate, glabrous; petioles and pubescent calyx glandular; flowers pentagynous. Var. *vir″idis*, has lance-ovate leaves, subtrilobate; stem unarmed.

puncta'ta, (common thorn-tree, w. M. ♄.) thorny or unarmed; leaves wedge-obovate, sub-plicate, glabrous, serrate; calyx villose; divisions subulate, entire.

oxycan″tha, (quickset, w. M. ♄.) leaves obtuse, somewhat 3-cleft, serrate glabrous peduncles and calyx somewhat glabrous segments of the calyx lanceolate, acute styles 2. Naturalized.

pyrifo'lia, (pear-leaf thorn, w. J. ♄.) thorny or unarmed; leaves oval-ovate, gash-serrate, somewhat plaited and rather rough-haired; calyx a little villose; leafets lance-linear, serrate; styles 3.

crus-gal''li, (thorn-tree, w. M. ♄.) thorny; leaves wedge-obovate, sub-sessile, shining, leathery, serrate; corymbs compound; leafets of the calyx lanceolate, sub-serrate; styles 2.

fla'va, (yellow-berried thorn, M. ♄.) thorny; leaves wedge-obovate, angled, glabrous, shining; petioles, calyx, and stipules, glandular; flowers sub-solitary; berries turbinate, 4-celled. 8-10 f.

lu'cida, (A. ♄.) thorny; leaves wedge-obovate, crenate, coriaceous, lucid; corymbs simple, few-flowered; styles 5. 10-12 f. *S.*

CRI'NUM. 6—1. (*Narcissi.*) [From *krinon,* a lily.]

america'num, leaves oblong-lanceolate, glabrous at the margin; flowers pedicelled, tube shorter than the limb. *S.*

CRITH''MUM. 5—2. (*Umbelliferæ.*)

mariti'mum, (sea samphire, w. ♃. Au.) leafets lanceolate; leaves twice ternate, glaucous, smooth, with a salt aromatic flavor. This is the true samphire of English botanists.

CRO'CUS. 3—1. (*Iridæ.*) [The ancients fabled that a youth, Crocus, was changed into this flower. Crocus also signifies saffron color.]

officina'lis, (saffron crocus, y. ♃.) leaves linear, with revolute margins; stigma exsert, with long linear segments. Var. *sati'vus,* having violet corollas. The stigma is of a deep orange color, and affords the saffron of commerce. Blossoms in September. Ex.

ver''nus, (spring crocus,) stigma not exsert, with three short, wedge-shaped segments; tube hairy at the mouth. Color of the flower various, purple, yellow, &c. Blossoms in March. Ex. Var. *versico'lor,* feathered with purple. *biflo'rus,* the Scotch crocus, striped white and purple, the earliest in spring. Var. *susia'nus,* striped orange and dark purple; *sulphure'us,* very pale yellow; *lute'us,* the common yellow.

CROTALA'RIA. 16—10. (*Leguminosæ.*) [From *krotalon,* a rattle.]

sagitta'lis, (rattle-box, y. Ju. ☉.) hairy, erect, branching; leaves simple, ovate-lanceolate; stipules lanceolate, acuminate, decurrent; racemes opposite the leaves, about 3-flowered; corolla smaller than the calyx. 12 i.

parviflo'ra, (y. J. ☉.) hirsute, erect, branching; leaves simple, lance-linear; stipules above decurrent, with two short teeth; racemes opposite to the leaves; corolla smaller than the calyx.

ova'lis, (y. Ju. ☉.) hirsute, diffuse, branching; leaves simple, oval, petioled, upper stipules scarcely decurrent, short; racemes opposite to the leaves, long; corolla as long as the calyx. 12 i. *S.*

læviga'ta, (Ju. ☉.) glabrous, erect, simple; leaves lance-oblong; stipules lanceolate, acuminate, decurrent; racemes opposite to the leaves, 3-flowered. *S.*

CRO'TON. 19—15. (*Euphorbiæ.*) [From *kroteo,* a tick, from the form of its seed.]

marati'mum, leaves oval, sub-cordate, obtuse, pale above, hoary beneath; branches tomentose; pistillate spikes few-flowered.

lacci''ferum, is the species from which the gum-lac is obtained; it is a southern plant.

tigli'um, leaves oval, acuminate, serrate; stem aborescent; this species affords a celebrated medicinal substance, called *croton* oil, an extract from the seeds. Ex.

tincto'rium, leaves rhomboid, stem herbaceous; from this plant is obtained the *litmus,* considered as one of the most delicate tests of the chemist. Ex.

CRYP''TA. 2—2. (*Portulaccæ.*) [From a Greek word, to conceal, the stamens being concealed in the capsular calyx.]

min''ima, (mud-purslane, w-g. ☉.) stem dichotomous, decumbent, striate; leaves wedge-oval or obovate, opposite, sessile, entire, papillose above, with very minute stipules; flowers axillary, sessile, solitary. Very abundant on the shores of the HUDSON, between low and high-water mark about a mile below ALBANY.

CRYPTOTŒ'NIA. 5—2. (*Umbelliferæ.*) [From a Greek word, to conceal, in allusion to the concealed edgings of the fruit.]

canaden''sis, (w. J. ♃.) the lower umbels originate from the axils of the upper leaves; fruit oblong; stem glabrous; leaves ternate, smooth; leafets rhomb-ovate, acute, gash-toothed. 1-2 f.

CUCU'BALUS. 10—3. (*Caryophylleæ.*)

be'hen, (campion, w. Ju. ♃.) glabrous decumbent; leaves oblong-oval, acute, nerveless; calyx inflated, veiny.

CUCU'MIS. 19—15. (*Cucurbitaceæ.*) [From the Celtic *cuce,* a hollow vessel.]

angu'ria, (prickly cucumber,) leaves palmate-sinuate; fruit globose, echinate.

me'lo, (muskmelon, y. Ju. ☉.) angles of the leaves rounded; pome oblong, torulose. Sweet scented. Ex.

sati'vus, (cucumber, y. Ju. ☉.) angles of the leaves straight; pomaceous berry oblong, scabrous. Brought from Asia.

colocyn''this, (bitter apple, ☉.) leaves many cleft; fruit globose, glabrous, very bitter. Ex. Poisonous.

an''guinis, (snake cucumber, ☉.) leaves lobed; fruit cylindric, very smooth, long, contorted, plaited. Ex.

CUCUR''BITA. 19—15. (*Cucurbitaceæ*) [The name signifies crooked.]

ovif''era, (egg-squash, ☉.) leaves cordate angled, 5-lobed, denticulate, pubescent pomaceous berry with fillet-like stripes lengthwise. Ex.

pep''o, (pumpkin, y. Ju. ☉.) leaves cordate, obtuse, sub-5-lobed, denticulate; pomaceous berry roundish or oblong, smooth. Var. *poti'ro,* has the fruit more or less flattened. From Asia.

citrul''lus, (watermelon, y. Au. ☉.) leaves 5-lobed; the lobes sinuate-pinnatifid, obtuse; pomaceous berry oval, smooth. Fruit watery, often striped. From Africa and the south of Asia.

lagena'ria, (gourd, calabash, w. Au. ☉.) leaves cordate, round-obtuse, pubescent, denticulate, with 2 glands at the base on the under side; pomaceous berry clavate, somewhat woody. Ex.

verruco'sa, (club squash, y. J. ☉.) leaves cordate, deeply 5-lobed; middle narrowed at the base, denticulate; pepo clavate, a little warty. Ex.

fœtidis''sima, (Ju. ♃.) stems procumbent, sulcate; leaves alternate, long-petioled, somewhat erect, triangular-cordate, scabrous, glaucous, thick; margin sinuate, undulate; fruit globose, smooth, sub-sessile; tendrils trichotomous. *S.*

CUNI'LA. 13—1. (*Labiatæ.*)

glabel''la, smooth; radical leaves nearly oval, cauline leaves oblong-linear, entire; flowers axillary, mostly solitary, on long peduncles. Limestone rocks. Niagara Falls. Stems 8 to 10 inches high, branched below. Corolla violet, longer than the calyx.

CUPHE'A. 11—1. (*Salicariæ.*)

viscosis''sima, (wax-bush, p. J. ♄.) viscous; leaves opposite, petioled, ovate-oblong; flowers with 12 stamens, lateral, solitary; peduncles very short.

CUPRES''SUS. 19—15. (*Coniferæ.*)

thyoi'des, (white cedar, M. ♄.) branchlets compressed; leaves imbricate four ways, ovate, tubercled at the base; strobile globular.

dis''ticha, (Feb.) leaves distichous, flat, deciduous; sterile florets paniculate, leafless; strobile spherical.

CUSCU'TA. 5—2. (*Convolvuli.*)

america'na, (dodder, w. Au. ☉.) flowers peduncled, umbelled, 5-cleft; stigma capitate. A bright yellow, leafless vine, twining round other weeds, in damp places.

europe'a, (w. Au. ☉.) flowers sub-sessile; stigma acute; stamens 4 or 5. Ex.

CY'CAS. 20—12. (*Cycadeæ.*) [This plant is intermediate between the Pines and Ferns.]

circina'lis, (sago-plant,) frond pinnate; leafets lance-linear, acute, 1-nerved, flat. East Indies.

CYMBID''IUM. 18—1. (*Orchideæ.*) [From *cymba*, a boat.]

pulchel''lum, (grass pink, r. Ju. ♃.) radical leaves ensiform, nerved; scape few-flowered; lip erect, slender at the base; lamina spread; disk concave, bearded. Var. *graminifo'lia*, leaves 1-2 lines broad; bracted ones acuminate. 12-18 i.

CYDO'NA. See PY'RUS.

CYNA'RA. 17—1. (*Cinarocephalæ.*)

scol''ymus, (garden artichoke, ♃.) leaves sub-spinose, pinnate; scales of the calyx ovate. Naturalized. Ex.

CYNOGLOS''SUM. 5—1. (*Boragineæ.*) [From *kuon*, a dog, and *glossa*, tongue.]

amplexicau'le, (wild comfrey, w. & b. J. ♃.) very hirsute; leaves oval-oblong; upper one clasping; corymbs terminal, leafless, long-peduncled.

sylvat''icum, (b. Ju. ♂.) nakedish; leaves spatulate-lanceolate, shining, scabrous beneath; racemes scattered. *S.*

officina'le, (hound-tongue, p. Ju. ♂.) very soft-pubescent; leaves broad-lanceolate, sessile; panicled racemes.

CYPE'RUS. 3—1. (*Cyperoideæ.*) [From *kuparos*, a round vessel, which the root resembles.]

inflex''us, (Au. ♄.) umbel 2 to 3-rayed, or conglomerated and simple; involucre 3-leaved, very long; spikelets collected into ovate heads, oblong, 8-flowered; glumes squarrose at the tip. 2-3 i.

flaves''cens, (yellow grass, Au. ♃.) spikelets linear-lanceolate, in fascicles of 3 to 4; glumes obtuse; style 2-cleft and lenticular; involucre 3-leaved, longer than the spikes 6-8 i.

phymato'des, (Au.) umbel simple or decompound; involucre 3 to 9-leaved; three of the leaves very long; peduncles compressed; spikelets distichous, linear; lower ones branched, about 15-flowered; sides rather convex; glumes oblong, obtuse; radicles tuberous at the extremities. 1 f.

mariscoi'des, (Au.) umbel simple or 1 to 2-rayed; spikelets capitate, linear, 7 to 8-flowered; glumes loose, obtuse. 8-12 i.

strigo'sus, spikes oblong, loose; spikelets subulate, expanding, a little remote; small involucres generally wanting; partial umbels with alternate rays. 2-3 f.

CYPRIPE'DIUM. 18—2. (*Orchideæ.*) [From *kupris*, Venus, *podion*, slipper.]

pubes''cens, (yellow ladies' slipper, y. M. ♃.) stem leafy; lobe of the style triangular-oblong, obtuse; outer petals oblong-ovate, acuminate; inner ones very long, linear, contorted; lip compressed, shorter than the petals.

specta'bile, (gay ladies' slipper, w. and p. J. ♃.) stem leafy; lobe of the style oval-cordate, obtuse; outer petals broad-oval, obtuse; lip longer than the petals, split.

acau'le, (low ladies' slipper, w. and p. M. ♃.) scape leafless, 1-flowered; radical leaves 2, oblong, obtuse; lobe of the style roundish-rhomboidal, acuminate, deflected petals lanceolate; lip shorter than the petals, cleft before. 1 f.

can''didum, (white ladies' slipper, w. M. ♃.) stem leafy; leaves oblong-lanceolate; lobe of the style lanceolate, rather obtuse; lip compressed, shorter than the lanceolate segments of the perianth.

parviflo'rum, (common ladies' slipper, y-g. M. ♃.) stem leafy; lobe of the style triangular, acute; outer segments of the perianth ovate-oblong, acuminate; inner ones linear, contorted; lip compressed, shorter than the perianth. 12 i.

CYRIL''LA. 5—1. (*Ericæ.*) [After Dr. Cyrilli, a botanist of Naples.]

racemiflo'ra, (w. J. ♄.) leaves lanceolate cuneate at the base, coriaceous, very smooth; petals thrice as long as the calyx 15 f. Sandy woods. Carolina. Charleston. La.

DAC''TYLIS. 3—2. (*Gramineæ.*) [From *dactulos*, a finger, from the appearance of its pericarp.]

glomera'ta, (J. ♃.) panicle glomerate; leaves carinate. 2-3 f.

DAH″LIA. 17—2. (*Corymbiferæ.*) [From *Dahl*, a Swedish botanist, and pupil of Linnæus.]

super″flua, root tuberous, leaves broad-lanceolate, serrate; 4-6 feet high. Varieties are numerous, exhibiting splendid and brilliant colors. Blossoms in autumn. A native of Mexico.

frustra'nia, (r. Oc. ♃.) rays barren: petiole wingless; leafets rough beneath. 6 f. Mexico. Var. *coccin″ea* scarlet daily,) rachis of leaves winged; leaflets, ovate, acuminate, serrate, shining, and smooth beneath; outer calyx reflexed. Var. *auran″tia*, (orange daily,) rachis of leaves naked; leafets ovate-acuminate, serrate, roughish beneath; outer calyx spreading. Var. *lu'tea*, (yellow daily,) leaves pinnate, leafets linear, pinnatifid toothed. *Excel″sa*, the most remarkable of the new species. It is a tree Dahlia, and is said to grow in Mexico thirty feet high, with a trunk thick in proportion.

DA'LEA. 16—10. (*Leguminosæ.*) [In honor of Dr. Dale, who wrote on medicine about the year 1700.]

aure'a, (y. ♃.) erect; spikes dense, cylindric; bracts as large as the calyx; calyx villose; leafets obcovate, pilose beneath.

laxiflo'ra, has white flowers upon panicled spikes.

alopecuroi'des, has blue flowers upon crowded spikes.

formo'sa, is a woody, branching plant, with purple flowers. This species furnishes green-house shrubs with pinnate leaves and papilionaceous flowers.

DALIBAR″DA. 11—12. (*Rosaceæ.*) [In honor of M. Dalibard.]

fragaroi'des, (dry strawberry, y. M. ♃.) leaves ternate; leafets wedge-form, gash-serrate, ciliate; peduncles many-flowered; tube of the calyx obconic. 5-8 i.

re'pens, stem creeping; leaves simple, cordate, crenate; stipules linear, setaceous; peduncles 1-flowered; calyx reflexed, smooth without. Mountains. Flowers white, on long peduncles.

DANTHO'NIA. 3—2. (*Græminea.*) [Named in honor of M. Danthoin, a French botanist.]

spica'ta, (Ju. ♃.) panicle simple, appressed; spikelets 7-9. about 7-flowered; lower palea hairy; leaves subulate; lower sheaths hairy at the throat.

DAPH″NE. 8—1. (*Thymeleæ.*) [From the nymph Daphne.]

meze'reum, (mezereon, M. ♄.) flowers sessile, cauline, in threes; leaves lanceolate.

odo'ra, (sweet mezereon, w. Ap. ♄.) flowers small, in terminal heads; leaves scattered, lance-oblong, glabrous.

DARLINGTO'NIA. 15—10. (*Leguminosæ.*) [Named after Dr. W. Darlington of Penn.]

interme'dia, (♃.) glabrous, herbaceous, unarmed; leaves 8 or 9 pairs; leafets 20 to 24 pairs, oblong-linear, with glands between the lower leaves; little heads solitary, peduncled, axillary; legumes falcate.

DATIS″CA. 20—12. (*Urticeæ.*)

hir″ta (false hemp, y. ♃.) stem hirsute; leaves pinnate; leafets running together at the base. Flowers small, panicled.

DATU'RA. 5—1. (*Solaneæ.*)

stramo'nium, (thorn apple, w-p. Au. ☉.) pericarps spinose, erect, ovate; leaves ovate glabrous, angular-dentate.

arbo'rea, (great Peruvian datura, w. Oct.) flowers pentangular, about one foot in length, fragrant. Ex.

tat″ula, (purple thorn apple, b. Ju. ☉.) pericarps spinose, erect, ovate; leaves cordate, glabrous, toothed. Stem reddish.

me'tel, (w. J. ☉.) leaves cordate, nearly entire, pubescent; pericarps prickly, globose, nodding.

DAU'CUS. 5—2. (*Umbelliferæ.*)

caro'ta, (carrot, w. J. ♂.) seeds hispid; petioles nerved underside; divisions of the leafets narrow-linear, acute. 2-3 f.

DECO'DON. 11—1. (*Salicariæ.*)

verticilla'tum, (swamp willow-herb, p. Aug. ♃.) leaves opposite, alternate, sometimes in threes, lanceolate, petiolated; flowers axillary, whorled; petals undulate; stem erect, pubescent. 2-3 f. Swamps.

DECUMA'RIA. 11—1. (*Myrti.*)

barba'ra, (w. Ju.) leaves ovate-oblong, acute at each end, slightly serrate.

DELPHIN″IUM. 12—2. (*Ranunculaceæ.*) [From *delphinos*, the dolphin, from the resemblance of the flower to a dolphin's head.]

azu'reum, (M. ♃.) petioles a little dilated at the base; leaves 3-5 parted, many cleft, lobes linear; raceme erect; petals densely bearded at the apex; flowers on short pedicels.

exalta'tum, (b. Ju. ♃.) petioles not dilated at the base; leaves flat, 3-7 cleft beyond the middle; lobes cuneate, 3-cleft at the apex, acuminate; lateral ones often 2-lobed; raceme erect; spur straight, about as long as the calyx; capsules 3.

tricor″ne, (b-w. M. ♃.) petiole scarcely dilated at the base, glabrous; leaves 5-parted; divisions 3-5 cleft, segments linear; nectary shorter than the corol; carpels arched, expanding from the base 8-12 i. *S.*

consol″idum, (larkspur, p. Ju. ☉.) nectaries 1-leafed; stem sub-divided. Ex.

ela'tum, (bee-larkspur, ♃.) 6 f. A native of Siberia.

aja'cis, (rocket larkspur, b. Au. ☉.) nectary 1-leafed, stem simple. 1 f. Ex.

DENDROM″ECON. 12—2. (*Papaveraceæ.*)

ri'gidum, (y. ♄.) glabrous, branching; leaves rigid and coriaceous, articulated with the stem, lanceolate or oblong, cuspidate, acuminate, strongly reticulate, denticulate on the margin; peduncles axillary 1-flowered; flowers large; a shrub. California. Poppy-tree.

DENTA'RIA 14—2. (*Cruciferæ.*) [Either from *dens*, a tooth, because its root is dentate; or from its supposed virtue in curing the toothache.]

diphyl″la, (tooth-root, w. M. ♃.) stem 2-leaved; leafets ternate, sub-ovate, unequally and incisely dentate; root toothed. 6-8 i.

lacinia'ta, (w. M. ♃.) leaves in threes, ternate; leafets 3-parted, segments oblong, gash-toothed; root tuberous, moniliform 3 i *heterophyl′la*, (p. J. ♃.) stem 2-leaved; leaves ternate, petiolate; leafets linear, sub-lanceolate, acute, entire, margin rough-ciliate; radical leafets ovate-oblong, incisely and coarsely toothed. Very small. Corymb about 9-flowered.

max″ima, (p. J. ♃.) leaves many, alternate, on long petioles, ternate; leafets sub-oval, incisely and acutely toothed, lateral ones lobed; axils naked; racemes lateral and terminal. 12-18 i.

multifi′da, (p.) stem 2-leaved; leafets many-parted; segments linear, somewhat acute. 10 i. *S.*

DESMO′DIUM. 16—10. (*Leguminosæ.*)

marylan″dicum, (Ju. Aug. p. ☉.) stem erect, pilose, branching; leaves ternate; leaflets oblong, villose beneath; stipules subulate; racemes paniculate; legumes 3-jointed, joints rhomboidal, reticulate, somewhat hairy.

obtu′sum, (Ju. Aug. ♃.) stem erect or ascending, pubescent; leaves ternate; leaflets ovate, obtuse, sub-cordate at base; stipules lanceolate-subulate; panicle terminal; joints of the legume semi-orbiculate, reticulate, hispid. 2-3 f.

akinia′num, (Ju. Aug. ♃.) stem erect, branching, pubescent; leaves ternate; leaflets ovate-oblong and sub-deltoid, acute, mucronate, scabrous beneath; stipules lanceolate-cuspidate, racemes paniculate, bracted; legumes with scabrous oval joints. 3 f.

cilia′re, (Aug. ♃.) stem erect, branching, pubescent; leaves ternate on short petioles; leaflets small, oval-obtuse, pubescent underneath, fringed along the margin; racemes axillary and terminal, paniculate; joints of the legume (2-3) oval, hispid.

læviga′tum, (Aug. ♃.) stem simple, erect, smooth, somewhat glaucous; leaves ternate, on long petioles; leaflets ovate, acute; panicle terminal; flowers in pairs on long pedicels; bracts ovate, acute, shorter than the flower-buds; lower segment of the calyx elongated; joints of the legume triangular. 3-4 f.

bracteo′sum, (Aug. ♃.) stem erect, smooth; leaves ternate; leaflets oblong-oval, acuminate, smooth; stipules subulate; racemes terminal, few-flowered; bracts ovate-acuminate, striate, glabrous; legume with sub-oval joints. 3-5 f.

DIAN″THUS. 10—2. (*Caryophylleæ.*) [From *dios*, Jove, and *anthos*, flower, from its superior elegance and fragrance.]

arme′ria, (pink, r. Ju. ☉.) flowers aggregate, fascicled; scales of the calyx lanceolate, villose, equalling the tube. 1 f.

barba′tus, (sweet-william, r. and w. Ju. ♄.) flowers fascicled; scales of the calyx ovate-subulate, equalling the tube; leaves lanceolate. Ex.

caryophyl″lus, (carnation or pink, and w. ♄.) flowers solitary; scales of the calyx sub-rhomboid, very short; petals crenate, beardless; leaves linear-subulate, channeled. By rich culture the stamens mostly change to petals. Ex.

arbor″eus, (tree pink,) a variety of the carnation.

chinen″sis, (china pink, Ju. ☉.) flowers solitary; scales of the calyx subulate, spreading leafy, equalling the tube; petals crenate, leaves lanceolate. Ex.

pluma′rius, (pheasant-eyed pink, r. and w. ♄.) flowers solitary; scales of the calyx sub-ovate, very short and obtuse, awnless; corolla many-cleft, with the throat hairy Ex.

carolin″ianus, flowers aggregate; peduncles long; scales smaller than the tube *S.*

deltoi′des, (London-pride,) flowers small, panicled. 9 i.

DIAPEN″SIA. 5—1. (*Convolvuli.*)

lappon″ica, (w. Ju. ♃.) cespitose; leaves spatulate, glabrous; flowers peduncled; anthers simple; stem short; leaves crowded, fleshy, evergreen, entire. Mountains.

cuneifo′lia, (J. ♄.) creeping; leaves lance wedge-form, pubescent below; flowers sessile; anthers horizontal, beaked at the base.

DICHON″DRA. 5—2. (*Convolvuli.*) [From *dis*, two, *chondros*, seed.]

carolin″ien″sis, (p. J. ♄.) pubescent, leaves reniform-emarginate; calyx villose, ciliate, creeping. *S.*

DIELY′TRA. 16—6. (*Papaveraceæ.*)

formo′sa, (M. ♄.) scape naked; raceme many-flowered, nodding; segments of the leaves oblong, pinnatifid; spurs slightly curved, obtuse; stigmas 2-angled; root bulbous; flowers rose-colored. Hills.

exim″ia, (p-r. M. ♄.) scape naked, simple, few-flowered; leaves bipinnate; segments linear, glaucous beneath; spurs 2, short, obtuse, stigma 4-angled, which distinguishes it from the preceding species. Scape 6-8 i. Root tuberous rather than bulbous. See CORYDA′LIS.

canaden″sis, (g-w. p. Ap.) spurs short, rounded; wing of the inner petals projecting beyond the summit; raceme simple; 4-6-flowered.

DIERVIL″LA. 5—1. (*Caprifoliæ.*) [From M Dierville, who first brought it from Arcadia.]

hu′milis, (bush honeysuckle, y. Ju. ♃.) peduncles axillary and terminal, dichotomous, 3-flowered; leaves ovate, serrate acuminate. 2-3 f.

DIGITA′LIS. 13—2. (*Scrophulariæ.*) [From *digitus*, a finger.]

purpu′rea, (foxglove, p. Ju. ♂.) leafets of the calyx ovate, acute; corolla obtuse upper lip entire; leaves lance-ovate, rugose Ex.

interme′dia, (p. Ju.) sepals lanceolate equal; corolla slightly pubescent, upper lip emarginate, 2-cleft; leaves pubescent at the margin and base.

DILA′TRIS. 3—1. (*Irideæ.*) [From *dis*, double, and *latris*, servant or attendant, because Bergius found two long, and one short stamen.]

tincto′ria, (red root, y. Ju. ♃.) leaves ensiform, shorter than the stem. Flowers in a corymbose panicle, woolly, yellow within. 2 f.

DIO′DIA. 4—1. (*Rubiaceæ.*) [From *diodos* the way-side.]

virgin'ica, smooth; stem procumbent; leaves lanceolate, opposite, acute, scabrous on the margin; fruit crowned by the 2-lobed calyx; stem smooth, slender, and purple; flowers white, solitary. (♃. Sept.)

DIONÆ'A. 10—1. (*Hypericeæ.*) [From *Dione*, one of the names of Venus.]
muscip''ula, (Venus' fly-trap, w. ♃.) radical leaves, with terminal, ciliate appendages, somewhat resembling a rat-trap; this is suddenly closed, on being irritated. *S.*

DIOSCORE'A. 20—6. (*Asparagi.*) [From Dioscorides.]
villo'sa, (May, ♃.) leaves alternate, opposite, verticillate, cordate, acuminate, pubescent beneath, 3-nerved. Woods. Stem climbing; 12 feet high. Flowers small, in panicles. The yam-root of the Indies is obtained from a species of this plant.
quaterna'ta, (J. ♃.) leaves verticillate by fours, and alternate, cordate, acuminate, glabrous, 7-9-nerved; lateral nerves divided. Stem climbing.

DIOSPY'ROS. 20—8. (*Rhododendra.*)
virgin''ia'na, (persimmon, g-y. May, ♄.) leaves ovate, alternate, oblong, acuminate, reticulately veined, nearly smooth; petioles pubescent; flowers solitary, axillary; fruit as large as a common plum, golden yellow. Var. *pubes''cens,* leaves oblong, acute, pubescent beneath; petioles long; fruit bearing few seeds. *S.*

DIPHYL''LIA. 6—1. (*Berberides.*) [From *dis*, double, *phullon*, leaf.]
cymo'sa, (w. J. ♃.) very glabrous; leaves sub-palmate, angularly lobed, serrate; cyme many-flowered. *S.*

DIP''SACUS. 4—1. (*Dipsaceæ.*)
sylves''tris, (wild teasel, w-b. Ju. ♂.) leaves rarely connate, opposite; scales of the receptacle straight; involucrum curved upward. 3-4 f. *S.*
fullo'num, (teasel, w. Ju. ♂.) leaves sessile, serrate; chaff hooked. 3-6 f.

DIR''CA. 8—1. (*Thymeleæ.*) [From *dirka*, a fountain.]
palus''tris, (leather-wood, y. Ap. ♄.) leaves oval, alternate, petioled, entire, obtuse. Shrub. 2-4 f.

DODECATH''EON. 5—1. (*Lycimachiæ.*) [From *dodeka*, twelve, and *theos*, a divinity, signifying the twelve Roman divinities.]
me'dia, (false cowslip, p. M. ♃.) leaves oblong-oval, repandly-toothed; scape erect, simple, smooth; umbel many-flowered; flowers nodding; bracts numerous, oval. Flowers large. 1-12 i.
integrifo'lium, (b. J. ♃.) leaves sub-spatulate, entire; umbels few-flowered, straight; bracts linear.

DODO'NÆA. 8—1. (*Sapindi.*)
visco'sa, ( ) leaves viscous, ovate-oblong, cuneiform at the base. Florida.

DO'LICHOS. 16—10. (*Leguminosæ.*)
multiflo'rus, (p-w. ♃.) stem twining, pubescent; leaves orbicular, short, acuminate, nearly glabrous when mature; racemes axillary, densely spiked, many-flowered, about as long as the petioles. 5-10 f. Ark. Geo.
purpu'reus, (wild cowhage, p. ☉.) twining; stem glabrous; corolla with spreading wings; petioles pubescent. *S.*
pru'riens, (cowhage, or cowitch, p. ☉.) twining; leaves hairy beneath; legumes in racemes; valves slightly keeled, hairy; peduncles in threes; legumes covered with stinging hairs. Ex.
luteo'lus, (w-y, Ju. ☉.) climbing-pubescent; leafets ovate, acuminate; peduncles longer then the leaves; spikes short, somewhat capitate; banner broad, reflexed; wings rhomboidal. 4 f. *S.*

DRA'BA. 14—1. (*Cruciferæ.*) [From *drasso*, to sneeze, from its effects upon the noses of those who eat it.]
carolin''ia'na, stem leafy at the base, hispid, naked and smooth at the top; leaves ovate, roundish, entire, hispid; pouch linear, smooth, longer than the pedicel. (Ap ☉. 2-4 i. w.)
ara'bizans, (M. ♂.) stem leafy, somewhat branched, sub-pubescent; leaves lanceolate, acute, toothed; silicles acuminate, with the permanent style.
ver''na, (w. M. A. ☉.) scapes naked, leaves lanceolate, somewhat toothed; petals 2-parted; silicles elliptical.

DRACOCEPH''ALUM. 13—1. (*Labiatæ.*) [From *drakon*, dragon, *kephale*, head.]
virgin''ia'num, (dragon-head, p. Au. ♃ spikes long, with the flowers crowded, bracts small, subulate; teeth of the calyx short, nearly equal; leaves sessile, opposite, linear-lanceolate, acutely serrate. 12 f.
canarien''se, (balm of Gilead,) flowers whorled; bracts lanceolate; leaves ternate-oblong. Ex.
corda'tum, (b. J. ♃.) stem and petioles pubescent; leaves cordate, obtusely crenate, somewhat hirsute above; spikes secund; pedicels 2-bracted. *S.*
parviflo'rum, (w. Ju. ♂.) flowers verticillate, sub-capitate; leaves ovate-lanceolate, deeply serrate, petioled; bracts foliaceous ovate, ciliate, serrate; serratures mucronate; teeth of the calyx unequal, scarcely shorter than the corol. *S.* The *canes''cens, grandiflo'rum,* and *austria'cum,* are exotics, and have large and splendid blue flowers.

DROSE'RA. 5—6. (*Hypericeæ.*) [From *drosera*, dewy.]
rotundifo'lia, (sundew, y-w. Au. ♃.) scape simple; leaves nearly orbicular, narrowed at the base; petioles long, downy. Wet or damp. 4-8 i.
longifo'lia, (y-w. Ju. ♃.) scape simple; leaves spatulate-obovate; petioles long, naked. 3-6 i. Swamps.
filifor''mis, (p. J. ♃.) scape sub-ramose, terete, glabrous; leaves very long, filiform; styles 6 to 9.
brevifo'lia, (w. r. J. ♃.) very small; scape rooting, simple; leaves short, wedgeform scarcely petioled; petals oval. *S.*

DRY'AS. 11—12. (*Rosaceæ.*) [From the *Dryads*, fabled wood-nymphs.]
integrifo'lia, (w. Ju. ♃.) leaves very entire, acute at the base; peduncles 1-flowered.
octopet''ala, (mountain avens, w. Ju. ♃.) leaves ovate-oblong, coarsely toothed, rugose, white-tomentose beneath; peduncles one flowered.

ECHITES. 18—5. (*Apocyneæ.*) [From *echis*, a serpent, on account of the twisting form of its shoots.]

diffor''mis, (w-y. M. Au. ♃.) climbing; lower leaves nearly linear, upper ones oval-lanceolate, acuminate; raceme corymbed; stamens included. Beautiful climbers. *S.*

ECHI'NOPS. 17—5. (*Cinerocephalæ.*) [From *echinos*, beset with prickles like a hedge-hog.]

sphæroceph''alus, (globe thistle, b.) leaves pinnatifid; stem branching. Austria.

ECH''IUM. 5—1. (*Boragineæ.*) [From *echis*, a viper, because it was supposed to heal the stings of that reptile.]

vulga're, (blue thistle. b. M. ♂.) stem tuberculate, hispid; leaves lance-linear, hispid; spikes lateral; stamens longer than the corolla. 2-3 f.

ECLIP''TA. 17—2. (*Corymbiferæ.*) [From *ekleipo*, to be deficient, its wingless seed distinguishing it from Verbesina.]

erec''ta, (w. Ju. ☉.) erect, dichotomose, strigose; leaves lanceolate, attenuate at base, rarely serrate; peduncles by pairs, long; leaves of the involucrum ovate, acuminate. *S.*

procum''bens, (w. J. ☉.) procumbent or assurgent; leaves long-lanceolate, narrowed at the base, sparingly serrate; leaves of the involucrum acutely lanceolate; disk florets 4-cleft. *S.*

ELEAG''NUS. 4—1. (*Eleagni.*) [From *eleia*, the olive.]

argen''tea, (oleaster, J. ♄.) unarmed; leaves undulate, oval-oblong, covered with silvery scales; flowers aggregate, sub-solitary, nodding. Southern. The fruit resembles small olives.

angustifo'lius, narrow-leaved oleaster.

latifo'lius, broad leaves, green on the upper surface, silvery beneath.

ELEPHANTO'PUS. 17—5. (*Corymbiferæ.*) [From *elephos*, elephant, *pous*, foot.]

carolinia'nus, (elephant-foot, r. Au. ♃.) radical and cauline leaves oblong, narrowed at the base, pilose on both sides; stem erect, pilose, leafy. 2 f.

nudicau'lis, (r. Au. ♃.) radical leaves oval-lanceolate, crenate, serrate, sub-scabrous, hairy beneath; stem hairy, rough, nearly naked. 1-2 f. *S.*

ELLIOT''TIA. 8—1. (*Ericæ.*) [In honor of Elliott, author of the Southern Flora.]

racemo'sa, (w. J. ♄.) leaves alternate, lanceolate, mucronate, entire, short-petioled, pubescent; racemes terminal. *S.*

ELLIS''IA. 5—1. [In honor of John Ellis.]

nycte'lea, (w. and b. J. ☉.) stem decumbent, branchy, leafy, brittle; leaves alternate, petioled, pinnatifid, roughish; flowers solitary. 6-8 i.

ambig''ua, (w. b. M. ☉.) stem decumbent, branching, glabrous, somewhat glaucous; leaves hirsute, lyrate, pinnatifid, sub-sessile; divisions sub-lanceolate, angularly toothed or lobed; racemes lateral and terminal. 4-6 i.

ELO'DEA. 12—5. (*Hypericæ.*)

virginica, (Ju. Au. p. ♃.) leaves sessile, clasping; stamens united below the middle.

petiola'ta, (p. Au. ♃.) leaves attenuated into a petiole; filaments united above the middle.

ELYTRA'RIA. 2—1. (*Acanthi.*)

virga'ta, (J. ♄.) leaves entire near the summit; scales under the flower ovate, villose along the margin. 12-18 i.

car''damon, furnishes the cardamon seeds of commerce. Highly aromatic. Ex.

EMPE'TRUM. 20—3. (*Ericæ.*) [From the Greek *en*, in, and *petron*, a stone.]

ni'grum, (M. ♄.) procumbent; branchlets glabrous; leaves imbricate, oblong-retuse, glabrous, with a revolute margin. A low shrub, found on the White Hills, with small and dense evergreen foliage, like that of the heaths. Flowers small, red; berries black.

ENSLE'NIA. 18—5. (*Apocyneæ.*) [In honor of A. Enslen, a botanist.]

al''bida, (Ju. y-w. ♃.) training; stem marked with an alternating pubescent line; leaves opposite, smooth, cordate-ovate, somewhat acuminate, sinuate at the base; corymbs axillary, many-flowered, long-peduncled; pedicels and calyx pubescent.

EPIDEN''DRUM. 18—1. (*Orchideæ.*) [From *epi*, upon, and *dendron*, tree.]

conop''sium, (air-plant. y. Au.) stem simple; leaves lanceolate, rigid, perennial, spikes erect; lamina of the lip 3-lobed, middle one retuse; inner petals narrow Parasite.

vanil''la, climbing; leaves ovate, oblong, sessile, cauline. The vanilla plant. The pericarp, which is a pod, contains aromatic seeds. Ex.

EPIGÆ'A. 10—1. (*Ericæ.*) [From *epi*, upon, *ge*, the earth.]

re'pens, (trailing arbutus, r. and w. Ap. ♄.) stem creeping; branches and petioles very hirsute; leaves cordate-ovate, entire; corolla cylindric.

EPILO'BIUM. 8—1. (*Onagriæ.*) [From *epi* upon, *lobos*, a pod.]

spica'tum, (willow herb, p. Ju. ♃.) leaves scattered, lance-linear, veiny, glabrous, flowers unequal; stamens declined. 4-6 f.

tetrago'num, (r. Ju. ♃.) leaves sessile, lanceolate-oblong, denticulate, lower ones opposite; stigma undivided; stem 4-sided, nearly smooth; flowers in terminal racemes. Low grounds. 2 f.

colora'tum, (r. p. Ju. ♃.) stem terete, pubescent; leaves mostly opposite, lanceolate acute, serrulate, sub-petiolate, smoothish with colored veins. 3-4 f.

linea're, (w. r. Ju. ♃.) stem terete, pubescent, wand-like, branched above; cauline leaves opposite, branch leaves alternate, linear, very entire; flowers few, terminal, long-peduncled. 1-2 f.

palus''tre, (marsh willow-herb, p. Ju. ♃.) stem terete, branched, somewhat hirsute, leaves sessile, lanceolate, somewhat toothed, opposite and alternate, smooth; stigma undivided; fruit pubescent.

leptophyl''lum, stem branching, sub-scabrous; leaves alternate, sub-sessile, linear, narrow, entire, glabrous, 1-nerved, acute, narrowed at the base; flowers axillary, solitary, peduncled.

EPIPH″EGUS. 13—2. (*Pediculares.*) [From *epi*, upon, *phegas*, the beech.]

virginia'nus, (beech-drops, cancer-root, y. p. Ju. ♃.) stem very branching; flowers alternate, distant; calyx short, cup-form, shorter than the capsule. The whole plant is yellowish-white, and of a naked appearance. 8-12 i. Astringent.

EQUISE'TUM. 21—1. (*Filices.*) [From *equus*, a horse, *seta*, bristly.]

hyema'le, (scouring rush, Ju. ♃.) stems erect, very scabrous, bearing spikes at the apex; sheaths 2-colored, withering at the base and apex; teeth with caducous awns. 2-3 f.

arven″se, (horse-tail, Ap. ♃.) sterile stems somewhat decumbent, with simple, square, and scabrous branches; fertile ones erect, simple; sheaths incisely toothed, cylindrical; teeth acute.

scirpoi'des, (Ju. ♃.) stem simple, ascending, glabrous, filiform, bearing a spike at the top; sheaths 3-toothed; teeth withering, with caducous awns at the apex. 3 6 i.

uligino'sum, (♃.) stem erect, round, furrowed, nearly smooth, somewhat branched; branches from the middle joints unequal; sheaths serrate above; teeth even, acute, black.

ERIAN″THUS. 2—2. (*Gramineæ.*)

alopecuroi'des, (p. S. ♃.) hair like involucre much longer than the glumes; awns straight. 6-10 f. *S.*

contor″tus, (Oc. ♃.) hairy involucre as long as the glume; inner valve of the paleas eared; awns spirally twisted. *S.*

ERI'CA. 8—1. (*Ericæ.*) [From *ereiko*, easy to break.]

pubes″cens, (downy heath, r. M.) corolla linear, pubescent, with the limb erect; capsule glabrous; leaves fringed. Ex.

cine'rea, (common heath, p. Au. ♄.) leaves narrow-linear, in threes; stem branched; flowers in dense clusters, drooping. Abundant on the heaths of England and Scotland.

cilia'ris, leaves in fours, ciliate; corolla egg-shaped, inflated. In boggy grounds. The heaths, though very common in Europe, are all exotics in America.

ERIGO'NUM. 9—1. (*Polygoneæ.*) [From *erion*, wool, *gone*, joint.]

tomento'sum, (Ju. ♃.) leaves oval, wedge-form at the base, glabrous above, white-downy beneath; cauline leaves in threes and fours; fascicles of flowers axillary, solitary, sessile. 2 f. *S.*

ERI'GERON. 17—2. (*Corymbiferæ.*) [From *er*, the spring, *geron*, an old man, because in the spring it has a white, hoary blossom, resembling gray hair.]

bellidifo'lium, (w-p. M. ♃.) hairy, gray; radical leaves obovate, sub-serrate; stem leaves remote, oblong-ovate, amplexicaul, entire; stem 3-5 flowered; rays nearly twice as long as the hemispherical calyx. 2-18 i.

philadel″phicum, (w-p. J. ♃.) pubescent; leaves wedge-oblong, sub-serrate, cauline ones half-clasping; ray florets capillary, as long as the disk; stem branched above, many-flowered. 2-3 f.

purpu'reum, (O. p. Ju. ♃.) pubescent; leaves oblong, toothed, clasping, upper ones entire; peduncles thickened, corymbed, lower ones elongated; scales of the calyx hairy on the keel; rays twice as long as the calyx. 2 f.

strigo'sum, (O. w. Ju. ♂.) strigose-pilose; leaves lanceolate, tapering to both ends; in the middle are a few coarse teeth, or they are entire; flowers corymb-panicled. 2-3 f.

heterophyl″lum, (W. w. J. ♂.) radical leaves round-ovate, deeply toothed, petioled, cauline ones lanceolate, acute, serrate in the middle; corymb terminal. 2-3 f.

canaden″se, (flea-bane, pride-weed, O. w. Ju. ⊙.) stem hispid, panicled; leaves lance-linear, ciliate; calyx cylindric; rays crowded, short. Var.

nudicau'le, (E. w. y. J. ♃.) glabrous, radical leaves lance-spatulate, acute, slightly toothed; stem simple, nearly leafless, long; terminal corymb few-flowered; rays as long as the involucre. 2 f.

as″perum, (W. w. Au.) hirsute-scabrous; stem slender, about 2-flowered; leaves lanceolate, acute, entire; calyx hemispherical. 12 i.

ERIOCAU'LON. 19—4. (*Junci.*) [From *erion*, wool, *kaulos*, a stem, because some of the species have a velvety stem.]

pellu'cidum, (pipe-wort, g. Au. ♃.) scape very slender, about 7-striped; leaves linear-subulate, channeled, glabrous, pellucid, 5-nerved, reticulate; head small, globose; scales of the involucre oval-obtuse. Grows in water. 6-12 i.

villo'sum, (♃.) scapes numerous, compressed, about 4-furrowed, villous; leaves short, subulate, linear, hairy; head small, spherical; corolla nearly black. 12 i. Charleston, S. C.

ERO'DIUM. 15—5. (*Gerania.*) [From *erodias*, a stork.]

cico'nium, (stork-bill geranium, ⊙.) peduncled, many-flowered; leaves pinnate, leafets pinnatifid, toothed; petals oblong, obtuse; stem ascending. Ex.

cicuta'rium, (hemlock-geranium, p. Ap ⊙.) peduncles many-flowered; leaves pinnate; leafets sessile, pinnatifid, gashed; corolla larger than the calyx; stem prostrate, hirsute. Ex.

moscha'tum, (musk geranium, ⊙.) peduncles many-flowered; leaves pinnate; leafets sub-petioled, oblong, gash-toothed; petals equalling the calyx; stem procumbent. Ex.

ER″VUM. 16—10. (*Leguminosæ.*) [From *ervum*, a field. Growing wild.]

hirsu'tum, (hairy tare, b-w. J. ⊙.) leafets linear, obtuse, mucronate; peduncles 3-6 flowered, shorter than the leaves; legume oblong, hairy. 2-3 f. Stem diffuse; leaves cirrose.

ERYN″GIUM. 5—2. (*Umbelliferæ.*)

aquat″icum, (button snake-root, w-b. Au. ♃.) leaves ensiform, ciliate-spinose; 12-18 inches long; flowers in ovate heads at the end of the branches.

mariti'mum, radical leaves sub-rotund, plicate, spinose; heads of flowers peduncled. Sea-holly. Root medicinal Ex

ERY'SIMUM. 14—2. (*Cruciferæ.*) [From *eruo*, to draw, from its power of producing blisters.]

amphib''ium, (water-radish, y. J. ♃.) silique or rather silicle, oblong ovate, declined; leaves lance-oblong, pinnatifid or serrate; petals longer than the calyx. Wet. 1-2 f.

palus''tre, (y. Ju. ☉.) leaves lyrate pinnatifid; lobes confluent, unequally dentate, smooth; petals as long as the calyx; siliques short-turgid; root spindle-form. 18 i.

cheiranthoi'des, (g.) leaves lanceolate, sub-dentate, somewhat scabrous, green; siliques erect, spreading, twice as long as the pedicels; stigma small, sub-sessile. Flowers small. *S.*

as''perum, leaves linear-oblong: lower ones tooth-runcinate, all scabrous, pubescent; siliques spreading; style short and thick. *S.*

ERYTHRI'NA. 16—10. (*Leguminosæ.*) [From *eruthros*, blushing.]

herba'cea, (r. M. ♃.) small leaves ternate; leafets rhomboidal, glabrous; spikes long, stem herbaceous, prickly. 2-4 f.

cris''ta-galli, (coxcomb evergreen, r. M. ♄.) leaves ternate; petioles prickly, glandular, stem unarmed.

ERYTHRO'NIUM. 6—1. (*Liliaceæ.*) [From *eruthros*, red, on account of the color of its juice.]

america'num, dens-canis, (dog-tooth violet, adder's tongue, y. Ap. ♃.) leaves lance-oval, punctate; petals oblong-lanceolate, obtuse at the point; inner ones 2-dentate near the base; style clavate; stigma entire; stigmas 3. 6-8 i.

albid''um, leaves elliptical-lanceolate, not punctate; segments of the petals linear-lanceolate obtuse, inner ones without dentures, sub-unguiculate; style filiform; stigma 3-cleft, lobes reflexed; flowers white. Wet meadows. Ap. May. Scape 6 inches high.

EUCHRO'MA. 13—2. (*Scrophulariæ.*) [From *eu*, fine, *chroma*, color.]

cocci'nea, (painted cup, y. and r. J. ♂.) leaves alternate, linear, gash-pinnatifid; divisions linear; bracts dilated, generally 3-cleft, longer than the flowers; calyx 2-cleft, about equal to the corolla, divisions retuse, emarginate; flowers yellow, with scarlet bracts. One variety, *pallens*, has yellow bracts. 10-16 i.

grandiflo'ra, (g. w. M. ♃.) leaves and bracts mostly 3-cleft; segments divaricate; calyx 4-cleft, partly oblique; corol longer than the calyx, divisions of the lower lip acuminate. Bracts not colored.

EUON''YMUS. 5—1. (*Rhamni.*) [From *eu*, good, *nomos*, name.]

america'nus, (burning bush, spindle-tree, r-y. J. ♄.) branches opposite, smooth, square; leaves opposite, sub-sessile, elliptic lanceolate, serrate; peduncles mostly 3-flowered, terete; calyx small; corolla 5-petalled; fruit warty, scarlet. Shady woods. 4-6 f.

atropurpu'reus, flowers dark purple; fruit bright red.

obova'tus, flowers green, tinged with purple.

EUPATO'RIUM. 17—1. (*Corymbiferæ.*) [From its discoverer, Eupator, king of Pontus.]

1. *Involucres not more than 5-flowered.*

hyssopifo'lium, (hyssop thorough-wort, hemp-weed, w. Au. ♃.) stem erect; lowest leaves opposite, lance-linear, sub-dentate; corymb sub-fastigiate; style much longer than the corol. 2 f.

sessilifo'lium, (w. Au. ♃.) leaves sessile, clasping, distinct, lance-ovate, rounded at the base, serrate, very glabrous; stem somewhat glabrous. 2 f.

trunca'tum, (w. Ju. ♄.) leaves sessile clasping, distinct, lanceolate, truncate at the base, serrate, somewhat glabrous; stem pubescent.

verbenæfo'lium, (w. Au. ♃.) leaves sessile, distinct, lance ovate, rugose, scabrous, upper ones with coarse teeth at the base and with the summit entire. 2 f

al''bum, (Au. ♃.) leaves sub-sessile, lance-oblong, roughish, serrate; inner scales of the calyx long, lanceolate, scarious-colored. Seashore. 18-24 i.

pubes''cens, (E. w. Au. ♃.) leaves sessile, distinct, ovate, sub-scabrous, veiny, lower ones doubly serrate; upper ones sub-serrate; stem panicled, pubescent; branches fastigiate. 18-24 i. *S. W.*

2. *Involucres more than 5-flowered.*

purpu'reum, (purple thoroughwort, joe pye, p. Au. ♃.) leaves in fours or fives, petioled, lance-ovate, serrate, rugose-veined, roughish, stem hollow. 4-6 f.

perfolia'tum, (boneset, thoroughwort, w. Au. ♃.) leaves connate-perfoliate, oblong-serrate, rugose, downy beneath; stem villose. 2 f.

puncta'tum, (O. p. Au. ♃.) leaves in fours or fives, petioled, ovate, acuminate, serrate, scabrous both sides; stem solid, terete. 3-5 f. N. W. States.

verticilla'tum, (joe-pye's weed, p. Au. ♃.) leaves petioled, in threes or fours, lance-ovate, acuminate at each end, unequally serrate somewhat glabrous, stem solid, smooth. 6-7 f.

cælesti'num, (Au. ♃.) leaves petioled, heart ovate, obtusish, 3-nerved, obtusely serrate, slightly scabrous; involucre many-leaved; many-flowered, receptacle conic. 2-3 f.

aromat''icum, (w. Au. ♃.) leaves petioled, cordate-ovate, acute, 3-nerved, obtusely serrate, somewhat scabrous; flowers corymbed; scales of the involucres sub-equal. 2 f.

ageratoi'des, (w. Au. ♃.) leaves petioled, ovate-acuminate, 3-nerved, unequally and coarsely-toothed, serrate, glabrous; corymb many-flowered, spreading; involucre simple. 2-4 f.

fœnicula'ceum, (y-w. S. ♃.) stem panicled; leaves glabrous; lower ones pinnate upper ones clustered: all filiform. 3-10 f. *S*

cuneifo'lium, (E. w.) leaves petioled obovate-lanceolate, slightly serrate at the summit; 3-nerved, pubescent on both sides 1 f. *S.*

pinnati'fidum, (w. S. ♃.) leaves pinnatifid; lower ones verticillate; upper ones al ternate; divisions linear; pubescent; flowers corymbed. 3-4 f. *S.*

parviflo'rum, (w. S.) leaves sessile; narrow-lanceolate; very acutely serrate; pubescent on both sides; flowers corymbed; small; seeds angled. 2 f. *S.*

EUPHOR''BIA. 19—1. (*Euphorbiæ.*) [In honor of Euphorbus, physician to Juba, king of Mauritania.]

hypericifo'lia, (spurge, Ju. ⊙.) smooth, branching, erect, spreading; branches divaricate; leaves opposite, oval-oblong, serrate; corymbs terminal; flowers small.

corolla'ta, the 5-rayed umbel dichotomous; floral leaves and those of the stem oblong, obtuse; inner segments of the involucre petaloid, obovate; flowers conspicuous. 1-2 f.

officina'rum, stem naked, many-angled. Affords the gum-resin imported from Africa, under the name of euphorbium. Ex.

macula'ta, (Ju. O. ⊙.) stem procumbent, branching, hairy; leaves opposite, oval or oblong, serrulate, oblique at the base, short petioled, smooth above, hairy and pale beneath; flowers solitary and axillary, much shorter than the leaves.

ipecacuan''hae, (Ju. ♃.) procumbent, small, glabrous; leaves opposite; oboval or lanceolate; peduncles axillary, elongated, 1-flowered.

lathy'rus, (spurge caper, J. ♂.) umbel 4-cleft, dichotomous; leaves opposite, entire, lanceolate, pointing four ways. Ex.

EUPHRA'SIA. 13—2. (*Pediculares.*) [From *euphron,* delightful, pleasant to behold.]

officina'lis, (eye-bright, w-p. Ju. ⊙.) leaves ovate, obtusely toothed; lower divisions of the lip emarginate.

EVOL''VULUS. 5—2. (*Convolvuli.*) [From *evolvo,* to roll outward.]

argente'us, (p. M. ♄.) stem simple, erect; leaves oblong, acute, silky-tomentose on both sides; peduncles flowered, short. *S.*

nummula'ris, (⊙.) leaves roundish; stem creeping; flowers sub-sessile. *S.*

serice'us, (⊙.) leaves lanceolate, sessile, silky beneath; peduncles short, 1-flowered. *S.*

EX''ACUM. 4—1. (*Gentianæ.*)

pulchel''lum, (r. Au. ⊙.) corolla 4-cleft; calyx 4-parted, divisions subulate; panicle corymbed; peduncles filiform.

FA'GUS. 19—12. (*Amentaceæ.*) [From *phago,* to eat, its nuts being among the first fruits eaten by man.]

ferrugin''ea, (red-beech, y-w. M. ♄.) leaves ovate-oblong, acuminate, pubescent beneath, coarsely-toothed, at the base obtuse, sub-cordate, oblique; nuts ovate, acutely 3-sided.

sylvat''ica, leaves of a brighter green, and wood of a lighter color, than the preceding species. White beech.

FE'DIA. 3—1. (*Dipsaceæ.*) [From *pheido,* clemency, from its harmless properties.]

radia'ta, (wild lamb lettuce, w. J. ⊙.) stem dichotomous; leaves spatulate-oblong, sub-entire; fruit pubescent, about 4-sided, naked at the apex. 8-18 i.

olito'ria, (lamb lettuce,) stem dichotomous; leaves lance-linear. Ex. See VALERIANELLA.

FERU'LA. 5—2. (*Umbelliferæ.*) [From *ferio,* to whip.]

villo'sa, (giant fennel, w. Ju. ♃.) leaves on long petioles, ternate, the partitions quinate; leafets ovate, serrate, rigid, veiny stem villose.

assafœ'tida, leaves alternate, sinuate, obtuse. A plant of Persia, which affords from its roots a gum known as the assafœtida of commerce.

FESTU'CA. 3—2.

ela'tior, (fescue-grass, O. J. ♃.) panicled spreading, very branching, lax; spikelets ovate-lanceolate, 4-5-flowered; florets slightly armed; leaves flat; root creeping 3-4 f.

tenel''la, (E. J. ⊙.) panicle spiked, very simple, one-sided; spikelets about 9-flowered; bristles shorter than the subulate florets; culm filiform, angular above; leaves setaceous. 8-15 i.

praten''sis, (J. ♃.) panicle spreading branched; spikelets linear, many-flowered acute; leaves linear; root fibrous. 1-2 f.

spica'ta, (w. J.) spikelets alternate, sessile, erect; somewhat 5-flowered; florets subulate, sub-glabrous, with a long scabrous awn; linear leaves and culm glabrous.

grandiflo'ra, (E.) panicle simple, erect; spikelets very few; generally 7-flowered; florets acute, distant.

nu'tans, (nodding festuca, J. ♃.) panicle slender, diffuse, at length nodding; branches long, in pairs, naked below; spikelets lance-ovate, about 3-flowered; florets smooth, awnless, and nearly nerveless. 3 f.

FI'CUS. 20—3. (*Urticeæ.*)

ca'rica, (fig-tree, g. Ju. ♄.) leaves cordate 3 or 5-lobed, repand-toothed; lobes obtuse scabrous above, pubescent beneath. 5-8 f. Ex.

FLŒR''KIA. 6—1. (*Ranunculaceæ.*) [From a German by the name of Flœrke.]

palus''tris, (false mermaid, w-y. Ap. ♃.) stem decumbent, terete, slender, smooth, leaves alternate, trifid and pinnatifid, with a long petiole. Marshes.

FOTHERGIL''LA. 11—2. (*Amentaceæ.*)

alnifo'lia, (witch-alder, W. Ap. ♄.) leaves wedge-obovate, crenate-toothed above. *S.*

FRAGA'RIA. 11—12. (*Rosaceæ.*) [From *fragro,* to smell sweet.]

virginia'na, (wild strawberry, w. M. ♃.) calyx of the fruit spreading; hairs on the petioles erect, on the peduncles close-pressed; leaves somewhat glabrous above.

grandiflo'ra, (pine-apple strawberry,) calyx of the fruit erect; hairs erect; leaves somewhat glabrous above. Ex.

ves''ca, (English strawberry, w M. ♃.) calyx of the fruit reflexed; hairs on the petioles spreading, on the peduncles close-pressed. Ex.

canaden''sis, (mountain strawberry, M ♃.) large; leafets broad-oval, lateral ones manifestly petioled; pedicels long, re curved-pendulous; receptacle of the seeds globose, favose-scrobiculate, villose.

ela'tior, (hautboy strawberry, w. ♃.) calyx of the fruit reflexed; hairs on the peduncle and petiole spreading. Ex.

FRANKE'NIA. 7—3. (*Caryophylleæ.*) [From Prof. John Frankenius, of Upsal, Sweden.]

grandiflo'ra, (see heath.) leaves obovate-cuneiform, mucronate, with revolute margins, rather coriaceous, very minutely hairy and ciliate, particularly at the base; stem prostrate; branches and calyx minutely hairy. A dwarf-perennial. *S.*

FRASE'RA. 4—1. (*Gentianeæ.*)

verticil''lata, (American columbo, g-y. Ju ♂.) leaves oblong-lanceolate, whorled or opposite, smooth; flowers on whorled peduncles. Medicinal. Swamps. 3-6 f.

FRAX''INUS. 20—2. (*Jasminæ.*) [From *phraxis*, a hedge: used in making hedges.]

acumina'ta, (white ash, w-g. M. ♄.) leafets petioled, oblong, shining, acuminate, very entire, or slightly toothed, glaucous beneath; flowers calycled.

pen''dula, weeping ash.

or''nus, leaves pinnate. Flowering ash.

sambucifo'lia, (black ash, M. ♄.) leafets sessile, ovate-lanceolate, serrate, the lateral ones somewhat rounded and unequal at the base.

juglandifo'lia, (swamp ash, M. ♄.) leaves pinnate; leafets petiolate, ovate, opaque, serrate, glaucous beneath; axils of the veins pubescent; branches smooth; flowers calyculate.

FRITILLA'RIA. 6—1. (*Liliaceæ.*) [From *fritillus*, a chess-board, in reference to the variegated petals of one of its species.]

imperia'lis, (crown imperial, r. and y. M. ♃.) flowers under a leafy crown, nodding; leaves lance-linear, entire. From Persia.

lanceola'ta, (p. Ju. ♃.) stem leafy, 1-2-flowered; leaves lance-linear, lower ones whorled; petals lanceolate. *S.*

molea'gris, (fritillary, Guinea-hen flower, p. and y. M. ♃.) leaves alternate, linear, channelled; stem 1-flowered; nectary linear; flower checkered.

al''ba, (w. Ap. ♃.) glaucous; leaves remotish, alternate, sessile, oblong-linear, flattish, oblique, obtuse, substriate beneath; flowers 1-3, axillary and terminal. 1 f.

FU'SCHSIA. 8—1. (*Onagræ.*) [From a German botanist, Leonard Fuschs.]

magella'nica, (ear-drop, r.) peduncles axillary, 1-flowered; leaves opposite or in threes, very entire; flowers pendulous. Ex.

FU'CUS. 21—4. (*Algæ.*) [*Phucus*, the Greek for sea-weed.]

lo'rens, stem very short, dilated into a cup, sending out a fusiform, dichotomous receptacle. In the ocean.

FUMA'RIA 16—6. (*Papaveraceæ.*) [From *fumus*, smoke.]

officina'lis, (fumitory, r. J. ⊙.) stem branching, spread; leaves more than decompound; leafets wedge-lanceolate, gashed. Naturalized. 6-10 i.

FUNA'RIA 21—2. (*Musci.*) [From *funis*, a rope in allusion to its long pedicels.]

hygromet''ica, (hygrometer moss,) leaves ovate, acute, concave, entire, inflected; capsules swelling, drooping, pear-form; pedicels very long, twisting spirally when dry.

GALAC''TIA. 16—10. (*Leguminosæ.*) [From *gala*, milk.]

mollis, (Ju. ♃.) stem twining soft-pubescent; leaves ternate; leafets ovate-oblong, obtuse, pale beneath; racemes axillary, a little longer than the leaves, pedunculate; flowers pedicelled; calyx acuminate villose; legume compressed, villose; flowers small, purple. Milk plant. Pine barrens.

glabel''la, leafets shining above; stem smooth.

pilo'sa, stem twining, minutely and retrorsely hirsute; leafets oblong-ovate, finely hirsute on both surfaces, pale beneath; racemes much longer than the leaves; flowers on short pedicels, scattered and remote; legume villous. *S.*

GALAN''THUS. 6—1. (*Narcissi.*) [From *gala*, milk, *anthos*, flower, in allusion to its whiteness.]

nival''is, (snow-drop, w. Ap. ♃.) leaves linear, keeled, acute, radical; scape 1-flowered. Ex.

plican''thus, (Russian snow-drop,) flowers smaller than the preceding.

GALAR''DIA. 17—3. (*Corymbiferæ.*)

pinnatifi'da, (y. p.) leaves pinnatifid; divisions lance-linear, somewhat entire. 8 i.

GA'LAX. 5—1. (*Sempervivеæ.*) [From *gala*, milky, because of the whiteness of its flowers.]

rotundifo'lia, (w. J. ♃.) very glabrous, leaves round-reniform, toothed; spike very long. *S.*

GALE'GA. 16—10. (*Leguminosæ.*) [From *gala*, milk, because it increases the milk of animals who eat it.]

virginia'na, (goat's-rue, r-y. w. Ju. ♃.) erect; leafets 8-12 pairs, oval-oblong, mucronate, white-villose beneath; raceme terminal; legumes falcate, villose. 1 f.

GALEOP''SIS. 13—1. (*Labiatæ.*) [From *gale*, a weasel, *opsis*, appearance.]

lada'num, (red hemp-nettle, r-w. Ju. ⊙.) stem hairy, not swollen below the joints; leaves on short petioles, lanceolate, serrate, hairy; flowers whorled; upper lip of the corolla slightly crenate. 1 f. Waste grounds. Introduced.

tetra'hit, stem hispid, swollen between the joints; flowers rose-colored, with a white tube, lower lip dotted with purple.

GA'LIUM. 4—1. (*Rubiceæ.*) [From *gala* milk, some species having the property of coagulating milk.]

trifi'dum, (bed-straw, w. Ju. ♃.) stem procumbent, scabrous backwards; cauline leaves in fives, branch leaves in fours, linear, obtuse, scabrous at the margin and on the nerves; terminal, few-flowered; pedicel short; corollas mostly 3 cleft.

asprel''lum, (rough bed-straw, w. Ju. ♃.) stem diffuse, very branching, prickly backwards; leaves in fives and sixes, lanceolate, acuminate; margins and nerves prickly; pedicels short. 18-24 i.

tincto'rium, (dyer's cleavers, w. Ju.) stem diffuse smoothish; leaves linear, cauline leaves in sixes, branch leaves in fours; peduncles terminal, elongated, mostly 3-flowered. Wet woods. Stem weak and branching; leaves very narrow; corolla mostly 4-cleft. Used as a red dye.

obtu'sum, (E. w. J. ♃.) stem smooth; procumbent leaves in fours, oblanceolate, obtuse, rough on the margin and midrib.

brachia'tum, (bed-straw, E. w. Ju. ♃.) stem limber, long, brachiate-ramose, hispid; branches short; leaves in sixes, lance-oblong, acuminate, glabrous, margin and keel ciliate; branches whorled, the longest dichotomous; pedicels 2-flowered; fruit with hooks.

apari'ne, (W. w. J. ♂.) stem limber, scabrous backwards; leaves in about eights, linear, and linear-oblanceolate, mucronate, hispid above, margin and keel prickly; fruit hook-bristled. 3-4 f.

triflo'rum, (O. w. Ju. ♃.) stem procumbent, smoothish; leaves in fives or sixes, lance-obovate, mucronate, glabrous, scarcely ciliate at the margin; branchlets 3-flowered at the end; flowers pedicelled; fruit small.

borea'le, (O. w. Ju. ♃.) stem stiffly erect, smoothish, branching; branches short-erect; leaves in fours, linear-lanceolate, obtuse, 3-nerved, with involute scabrous margins; flowers panicled, terminal; fruit minutely hook-bristled. 12-24 i.

circæ'zans, (w-y. J. ♃.) stem erect, smooth or slightly pubescent on the angles; leaves in fours, oval, obtuse, smooth, margin and nerves ciliate; peduncles short, divaricate, few-flowered; flowers remote, sub-sessile, alternate; fruit nodding, with hooked bristles. 6-12 i.

lanceola'tum, (p. Ju. ♃.) stem erect, very smooth, with remote joints; leaves in fours, lanceolate, generally acute, smooth, 3-nerved, margin sub-ciliate; peduncles long, divaricate; fruit sub-sessile, nodding, covered with hooked bristles. 1 f.

latifo''lium, (p. Ju.) stem erect, smooth; leaves by fours, oval, acute, membranous, the margins somewhat hispid; peduncles divaricate, loosely many-flowered. *S.*

uniflo'rum, (p. J. ♃.) stem assurgent, smooth; leaves generally by fours, linear, acute, revolute; peduncles generally solitary, 1-flowered. 10-12 i. *S.*

hispidu'lum, stem procumbent, pubescent, much branched; leaves by fours, lanceolate, dotted, scabrous. *S.*

GAULTHE'RIA. 10—1. (*Ericæ.*) [From *Gaulthier*, a physician and naturalist.]

procum''bens, (spicy wintergreen, w. J. ♃. or ♄.) stem procumbent; branches erect; leaves obovate, acute at the base; flowers few, nodding. Berries red, consisting in part of the permanent calyx; a little mealy; pleasant tasted.

hispidu'la, (creeping wintergreen, w. M. ♄.) stem creeping, hispid; leaves oval, acute; flowers solitary, axillary, sub-sessile, having but 8 stamens, short-bell-form.

shal''lon, (w. J. ♄.) erect, fruticose; leaves ovate, sub-cordate, serrulate; raceme 1-sided, bracted; pedicels 2-bracted in the middle. *S.*

GAU'RA. 8—1. (*Onagræ.*)

bien''nis, (r-y. Au. ♂.) stem having leaves purplish, sessile, lanceolate, toothed; flowers in terminal spikes. Banks of streams.

angustifo'lia, (w. Ju. ♃.) leaves clustered, linear, repand, undulate; fruit oblong, 4-angled, acute at each end. 3 f.

mol''lis, leaves lanceolate, entire, clothed with soft hairs.

GELSEMI'NUM. 5—2. (*Bignoneæ.*)

sempervi'rens, (y. March, ♃.) stem twining, smooth, glabrous; leaves opposite, perennial, lanceolate, entire, dark green above, paler beneath; petioles short. *S.* Nearly allied to Bignonia.

GENIS''TA. 16—10. (*Leguminosæ.*) [From *genu*, a knee, on account of its joints.]

tincto'rea, (dyer's broom, y. Ju. ♄.) root creeping; stem sub-erect, suffruticose; branches terete, striate, erect; leaves lanceolate, smooth; flowers in spiked racemes, legumes smooth. Hills. Introduced. Affords a yellow dye. Ex.

GENTIA'NA. 5—2. (*Gentianæ.*) [From *Gentius*, king of Illyria.]

quinqueflo'ra, stem square, branched leaves ovate-lanceolate, sub-clasping, acute 3-nerved; flowers somewhat in fives, axillary and terminal; corolla sub-campanulate, 5-cleft, segments lanceolate, mucronate; calyx very short. Woods. Aug Flowers small, pale blue.

ochroleu'ca, large flowers, yellowish-white, striped inside with blue and purple.

crini'ta, (fringed gentian, b. Sept. ♃.) stem terete; branches long, 1-flowered leaves lanceolate, acute; corolla 4-cleft, divisions obovate, gash ciliate. 18 i.

sapona'ria, (b. Oct. ♃.) leaves ovate, lanceolate, acute, 3-nerved; flowers whorl-capitate, sessile; corolla ventricose, closed, 10-cleft, interior segments unequally 3-cleft, as long as the exterior ones; segments of the calyx ovate, shorter than the tube. 18 i. Soap gentian.

lu'tea, (yellow gentian, y.) leaves broad ovate, nerved; corollas about 5-cleft, wheel-form, whorled.

cates''baei, (Oc.) rough; leaves narrow-lanceolate; segments of the calyx linear-lanceolate, twice as long as the tube; corolla with the border erect, the interior segments short, 2-cleft, fimbriate. *S.*

GERA'NIUM. 15—10. (*Gentianæ.*) [From *geranos*, a crane, because its pistil is long, like a crane's bill.]

macula'tum, (crow-foot geranium, r. and b. J. ♃.) erect; pubescence reversed; stem dichotomous; leaves opposite, 3-5 parted, gashed, upper ones sessile; peduncles 2-flowered; petals obovate. 1-2 f.

sanguin''eum, (bloody geranium, ♃.) peduncle 1-flowered; leaves 5-parted, 3-cleft, orbicular; capsule bristly at the top. Ex.

robertia'num, (herb-robert, p. Sept. ☉.) leaves ternate or quinate, pinnatifid, peduncles long, 2-flowered; calyx angular hairy; carpels small, wrinkled, stem long Plant fetid *carolinia'num,* diffuse, pubescent; leaves opposite, 5-lobed, crowded toward the top; flowers small, white. *S*

cæspito'sum, radical leaves reniform, deeply cleft; flowers red. *S.*

pusil''lum, (small crane's bill, b. M. ☉.) leaves sub-reniform, 7-lobed; lobes 3-cleft; peduncles short, 2-flowered; petals emarginate, scarcely longer than the awnless calyx; carpels keeled, pubescent; seeds smooth. Probably synonomous with *dissectum.*

dissec'tum, (wood geranium, r. Ju. ☉.) leaves 4-parted; lobes opposite, petiolate, 3-cleft, linear; peduncles short, 2-flowered; petals emarginate, rather shorter than the awned calyx; carpels hairy, not rugose; seeds reticulate. 12 i.

columbi'num, (long-stalked geranium, C. M. ♃.) peduncles 2-flowered, longer than the leaves; leaves 5-parted; lobes many-cleft, linear; petals emarginate, of the length of the awned calyx; carpels glabrous.

GERAR''DIA 13—2. (*Scrophulariæ.*) [From *Gerarde,* a writer on plants in 1597.]

tenuifo'lia, (p. Au. Sept. ♂.) very branching; leaves linear, acute, scabrous; peduncles axillary, longer than the flowers; teeth of the calyx acute. 6-10 i.

fla'va, (false foxglove, y. Ju. ♃.) pubescent; stem nearly simple; leaves sub-sessile, lanceolate, entire, or toothed, lower ones sub-pinnatifid, gashed; flowers axillary, opposite, sub-sessile. 2-3 f.

glau'ca, (oak-leaf foxglove, y. Ju. ♃.) smooth; stem panicled; leaves petioled, pinnatifid, paler beneath, the upper ones lanceolate; flowers axillary, opposite, on pedicels. 3-5 f.

pedicula'ria, (lousewort foxglove, y. Sept. ♂.) pubescent, brachiate-panicled; leaves oblong, doubly gash-serrate and pinnatifid; flowers axillary, opposite, pedicelled; divisions of the calyx leafy, gash-toothed. Var. *pectina'ta,* stem and branches densely pilose; leaves ovate, pectinately sub-bipinnatifid, soft pubescent; calyx hirsute. 2 f.

purpu'rea, (p. Au. ☉.) stems with opposite branches; leaves linear, slender; flowers axillary, opposite, sub-sessile; segments of the calyx subulate. 12-18 i.

aphyl''la, (p. Ju. ☉.) stem naked, nearly simple, with small, deciduous, opposite, ovate scales; corolla longer than the peduncle. 3 f. *S.*

fascicula'ta, (p. S. ☉.) stem rigid, erect, branching near the summit; leaves opposite, and in threes, sometimes alternate, linear, clustered, very scabrous; peduncles much shorter than the leaves. *S.*

GE'UM. 11—12. (*Rosaceæ.*)

riva'le, (purple avens, p. J. ♃.) pubescent; stem simple; radical leaves interruptedly pinnate, cauline ones 3-cleft; flowers nodding; petals as long as the calyx; awns plumose, nearly naked at the top, minutely uncinate. 10 i.

virginia'num, (avens, w. Ju. ♃.) pubescent; radical and lower cauline leaves ternate, upper ones lanceolate; stipules ovate, sub-entire; flowers erect; petals shorter than the calyx; awns hooked, naked at the apex twisted, hairy. Var. *trilobum,* has the radical leaves 3-lobed, or ternate. 2 f.

stric''tum, (upright avens, O. y. J. ♃.) hirsute; leaves all interruptedly pinnate, the odd one largest; leafets ovate, toothed, stipules gashed; divisions of the calyx 5, alternately linear, short; flowers erect; petals roundish, longer than the calyx; awn naked, hooked. 2 f.

al''bum, (w. Ju. ♃.) pubescent; radical leaves pinnate, cauline ones ternate, upper ones simple, 3-cleft; lower stipules gashed, flowers erect; petals of the length of the calyx; awns hooked, naked, hairy at the end. 2 f.

triflo'rum, (W. w. ♃.) pilose; stem simple, somewhat 3-flowered; radical leaves interruptedly pinnate; leafets wedge-form, gash-toothed; petals oblong, as long as the calyx; awns very long, villose. *S.*

coccin''eum, a splendid plant, a native of Chili, with large orange-scarlet flowers.

urba'num, (y. M. ♃.) flowers erect; awns hooked, naked; stem erect, branching, hairy; radical leaves pinnatifid in fives, cauline ones palm-ternate, upper ones ovate, 1-lobed; stipules large, sub-orbicular. 12-18 i. Ex.

GILLE'NIA. 11—5. (*Rosaceæ.*)

trifolia'ta, (Indian physic, w. J. ♃.) leaves ternate; leafets lanceolate, serrate; stipules linear; flowers in loose, terminal panicles, large, medicinal. Emetic resembling ipecac.

stipula'cea, (w. J. ♃.) radical leaves pinnatifid, stem leaves ternate; leafets incisely serrate; stipules foliaceous, ovate, incisely toothed and clasping; flowers in loose, terminal panicles, large. Var. *inci'sa,* has ternate leaves, with leafets gash-toothed. 2-3 f.

GLAU'CIUM. 12—1. (*Papaveraceæ.*) [From *glaukos,* sea-green, from its color.]

lu'teum, (horned poppy, y. Ju. ☉.) stem glabrous; cauline leaves clasping, repand; peduncles 1-flowered; silique tuberculate and a little scabrous. *S.*

GLADIO'LUS. 3—1. (*Irideæ.*) [Diminutive of *gladius,* a sword, from the shape of its leaves.]

ensiform''is, (p. r. b. Ju. ♃.) leaves ensiform, glabrous, entire; flowers spiked, colors various; root bulbous.

GLAUX. 5—1. (*Lysimachiæ.*) [From *glaukos* sea-green.]

marati'ma, (black salt-wort, r-w. ♃.) leaves roundish, entire, fleshy; stem leafy. 4-5 i. Marshes on the sea-coast.

GLECHO'MA. 13—1. (*Labiatæ.*) [From *glukos,* sweet.]

hedera'cea, (ground ivy, gill-overground, b. and r. M. ♃.) leaves reniform, crenate; stem rooting. Var. *cordata,* leaves cordate.

GLEDITSCH''IA. 20—6. (*Leguminosæ.*) [From *Gleditsch,* professor of botany at Frankfort.]

triacan''tha, (honey-locust, w. J. ♄.) thorn strong, cross branched; a large tree with oval and oblong leaves pinnate; legumes large, not caducous.

monosper'ma, pods small, 1-seeded. Water locust.

GLYCIRRHI'ZA. 16—10. (*Leguminosæ.*) [From *glukos*, sweet, and *riza*, root.]

gla'bra, legume glabrous; leaves pinnate; root tuberous, sweet. Liquorice. Ex.

lepido'ta, (w. Ju. ♃.) leafets oblong, acute, silky, villose; legumes racemed, oblong, hispid. 3-5 f.

GNAPHA'LIUM. 17—2. (*Corymbiferæ.*) [From *gnaphalon*, cotton.]

margaritace'um, (large-flowered life-everlasting, y. and w. Ju. ♃.) leaves linear, lanceolate, gradually narrowing, acute; stem branching above; corymb fastigiate; flowers pedicelled; flowers with white, pearly rays, and yellow disks. 1-2 f.

polyceph''alum, (sweet-scented life everlasting, y w. Ju. ☉.) leaves lance linear, acute, glabrous above, downy beneath; stem panicled, downy; corymbs terminal. 1-2 f

plantagin''eum, (early life-everlasting, o. w. Ap. ♃.) shoots procumbent; stem simple; radical leaves spatulate, ovate, and obovate, nerved; corymb close pressed; flowers diœcious; inner scales of the calyx elongated, acutish, colored. 6-10 i.

america'num, (y w. J. ☉.) herbaceous, erect, branching; leaves obovate-spatulate, pubescent beneath; flowers axillary and terminal, in glomerate spikes. 6-8 f.

sylvat''icum, (Ju. ♃.) stem erect, simple, downy; flowers in a leafy spike, axillary and terminal; leaves lance-linear, downy. 12 i.

decur''rens, (neglected life-everlasting, y. Ju. ♃.) stem erect, much branched; leaves linear-lanceolate, very acute, decurrent, white and woolly beneath, naked above; flowers in dense, terminal, roundish clusters. 2 f.

purpu'reum, (p. Ju. Oc. ♃.) herbaceous; stem erect, simple; leaves linear-spatulate, tomentose beneath; flowers sessile, clustered, axillary, and terminal. 8-12 i.

uligino'sum, (marsh cudweed, Au. ☉.) stem herbaceous, branched, diffuse, woolly; leaves linear-lanceolate; flowers in terminal crowded clusters, which are shorter than the leaves. 4-6 i.

german''icum, (common cudweed, Au. ☉.) stem herbaceous, erect, proliferous at the summit; leaves lanceolate, acute, downy; flowers capitate in the axils of the branches, and terminal. 6-8 i.

dio'ica, (w. M. ♃.) stoloniferous, creeping; leaves tomentose beneath chiefly, radical ones spatulate, obscurely 3-nerved at the base, cauline ones lance-linear; stem simple; flowers corymbose, capitate, diœcious.

GOMPHRE'NA. 5—1. (*Amaranthi.*) [From the surname of Pliny, the naturalist.]

globo'sa, (globe amaranth, bachelor's button, r. Au. ☉.) stem erect; leaves lance-ovate; heads solitary; peduncles 2 leaved. Ex.

GONOLO'BUS. 18—5. (*Apocyneæ.*) [From *gonia*, angle, *lobus*, a pod.]

obliqu'us, (false choak-dog, p J. ♃.) stem climbing, hairy; leaves ovate cordate, villose, acute; corymbs axillary; segments of the corolla ovate, acuminate, oblique, revolute; calyx small. 4-5 f.

hirsu'tus, (p. Ju. ♃.) stem twining, younger branches very hairy; leaves cordate-oval, acuminate, pubescent on both sides; segments of the corolla linear-oblong; follicles oblong, muricate; umbels 3-4 flowered. 3-4 f.

macrophyl''lus, (y. Ju.) leaves broad, cordate, with the sinus closed; abruptly acuminate; follicles muricate; lobes of the crown divided. *S.*

prostra'tus, (p.) stem prostrate, herbaceous; leaves reniform cordate, acute, tomentose underneath. 6-12 i. *S.*

viridiflo'rus, (g.) smooth, twining; leaves sub reniform-cordate, auricled at the base, acuminate, somewhat long peduncled; divisions of the corolla oblong-linear, oblique; obtuse follicles ribbed. *S.*

GOODYE'RA. 18—1. (*Orchideæ.*) [John Goodyer.]

pubes''cens, (rattlesnake leaf, scrophula weed, y. w. Ju. ♃.) leaves radical, ovate, petioled, veins colored, reticulate; scape sheathed; scape and flower pubescent; lip ovate, acuminate; petals ovate. 10-15 i.

re'pens, (w. Ju. ♃.) radical leaves ovate, petioled, reticulate; scape sheathed; scape and flowers pubescent; flowers one-sided, lip and petals lanceolate. 8 i.

GORDO'NIA. 15—12. (*Malvaceæ.*) [In honor of James Gordon.]

lasian''thus, (w. Ju. ♄.) leaves lance-oblong, shining, glabrous; flowers long, peduncled; capsules conical, acuminate. Evergreen. *S.*

pubes''cens, flowers large, white, with gold-colored stamens. Shrub. 5-6 f. *S*

GOSSYP''IUM. 15—12. (*Malvaceæ.*) [From an Egyptian word, *gottipium.*]

herbace'um, (cotton, Au. ♂.) leaves 5-lobed, mucronate, one gland beneath; stem herbaceous, smooth. 5 f. Ex.

GRATIO'LA. 2—1. (*Scrophulariæ.*) [Diminutive of *gratia*, so called on account of its supposed admirable qualities.]

virgin''ica, (creeping hedge-hyssop, w and y. ♃.) stem pubescent, assurgent, terete; leaves smooth, lanceolate, sparingly dentate, serrate, alternate, and connate at the base; leafets of the calyx equal; sterile filaments none. 6-8 i.

aure'a, flowers bright yellow, on axillary peduncles; stem 4-angled, rooting at the base.

carolin''ensis, (w. Ju. ♃.) stem smooth, somewhat branched, procumbent at the base, 4-sided above, terete below; leaves sessile, lance oblong, obtusish, dentate, 3-nerved; peduncles pubescent, short; divisions of the calyx lance-linear, equal, entire; bracts broader, expanding; corolla pubescent within; sterile filaments none capsule globose.

anagalloi'dea, (water hedge-hyssop, w-b. Ju. ♃.) sub-erect, very smooth; stem 4-sided; leaves oblong-oval, sparingly denticulate, shorter than the flowers; calyx without bracts, subulate, pubescent; corol smooth within; divisions generally obtuse. 3-6 i.

missouria'na, (J. y. ♃.) erect, terete, nearly simple; leaves narrow, lanceolate, connate, opposite, toothed at the apex; peduncles longer than the leaves; segments of the calyx linear-lanceolate, more than half as long as the tube of the corol; bracts longer than the calyx; whole plant viscid-pubescent. 4-6 i.

florida'na, (y. Mar. ☉.) glabrous, erect; leaves lanceolate, obsoletely denticulate, acutish; peduncle longer than the leaf; flowers largish, divisions emarginate. 9 i.

visco'sa, (w-p. Ap. ♃.) stem assurgent, viscid-pubescent, sub-terete; leaves smooth, sessile, lanceolate, acutish, dentate, 3-nerved; peduncles long; divisions of the calyx equal, lance-linear; bracts broader, expanding, shorter than the calyx; corolla pubescent within; sterile filaments two; capsules ovate, as long as the calyx.

pilo'sa, (w. Ju. ☉.) erect, branching, very hairy; stem 4-sided; leaves sessile, oval, dentate; flowers sub-peduncled; divisions of the calyx unequal; two intermediate ones small, setaceous; corolla smooth within; sterile filaments 2, very minute. 1-2 f.

GYMNOCLA'DUS. 20—10. (*Leguminosæ.*)

canaden''sis, (coffee-tree, w. J. ♄.) leaves bipinnate; leafets oval, acuminate, pubescent; flowers in racemes.

GYMNOSTY'LES. 17—4. (*Corymbiferæ.*) [From *gumnos,* naked, and *stulos,* style.]

stolonif''era, (M. ♃.) herbaceous, procumbent, creeping, glabrous; leaves pinnatifid; flowers sessile at the root.

GYNANDROP''SIS. 6—1. (*Capparides.*)

pentaphyl''la, (w. Ju. ☉.) smooth; leaves quinate and ternate; leafets entire, sub-serrulate; stamens inserted on the pedicel of the germ. 2 f.

GYRO'MIA. See MEDEO'TA.

GYROPHO'RA. 21—5. (*Algæ.*) [From *gyros,* a circle, and *sphero,* spherical.]

pennsylva'nica, frond tawny olive, under side rough granulate; receptacles marginated. On rocks and mountains.

HABENA'RIA. 18—1. (*Orchideæ.*) [From *habena,* a thong.]

psyco'des. (g-w. Ju. ♃.) lip 3-parted; segments finely divided; petals obtuse; horn filiform, clavate, ascending, longer than the germ.

cilia'ris, (orchis, y. Ju. ♃.) lip lance-oblong, pinnate-ciliate, twice as long as the petals; spur longer than the germ. 1-2 f.

dilata'ta, (giant orchis, w. or g. J. ♃.) spur shorter than the germ; lip entire, linear, with the base dilated, of the length of the spur; bracts of the length of the flower; stem leafy; in the mountain woods the flowers are green, in the meadows white. 1-4 f.

bractea'ta, (vegetable satyr, g-w. M. ♃.) lip linear, emarginate, obsoletely 3-toothed; spur short, sub-inflated, somewhat 2-lobed, bracts twice as long as the flowers, leaf-like, spreading; roots palmate. 6-10 i.

macrophyl''la, (g-y. J. ♃.) lip lanceolate, entire, acuminate; spur longer than the germ, serrate, nearly straight; upper petals ovate, acute; scape with 2 broad-oval sub erect leaves at the base. 1 f.

quin''quese'ta, (w.) lip 3-parted; lateral segments setaceous; inner petals 2-parted; lower segment setaceous, nearly as long as the outer petal; spur twice as long as the germ; leaves lance-oval; bracts acuminate. 2 f.

inte'gra, (y. Ju. ♃.) lip oblong, entire, longer than the inner petals; spur longer than the germ, acute at the point; stem leafy; bracts shorter than the flowers.

fusces''cens, (p-y. Ju. ♃.) lip ovate, toothed at the base; petals spreading; spur subulate, of the length of the germ; bracts longer than the flowers.

herbio'la, (y. J. ♃.) lip oblong, obtuse, toothed at the base; palate 1-toothed; spur filiform, shorter than the germ; bracts longer than the flowers. 1 f.

grandiflo'ra. (p, J.) lip dependent, twice as long as the petals, 3-parted; divisions wedge-form, fringed; middle one largest, with connivent fimbria; lateral petals fimbriate; spur ascending, clavate, longer than the germ; leaves oval-oblong. 2 f.

inci'sa, (w-p. Ju. ♃.) lip 3-parted; divisions wedge-form, gash-toothed, middle one emarginate; lateral petals obtuse, sub-dentate; spur subulate, ascending, of the length of the germ. 2-4 f.

fis''sa, (p. Ju. ♃.) lip 3-parted; divisions wedge-form, toothed; intermediate one 2-lobed; spur filiform, clavate, ascending, longer than the germ.

re'pens, (y-g. Au. ♃.) lip 3-parted; lateral segment setaceous; inner petals 2-parted; lower segment setaceous, scarcely longer than the outer petals; horn as long as the germ; leaves narrow, lanceolate; bracts acute. *S.* See ORCHIS.

HALE'SIA. 15—12. (*Malvaceæ.*)

tetrapte'ra, (snow-drop tree, w. Ap. ♄.) leaves lance-oval, acuminate, serrulate; corolla 4-cleft; fruit 4-winged.

dipte'ra, (w. Ap. ♄.) leaves lance-oval and ovate, acuminate, serrulate; petals 4, flowers octandrous; fruit compressed, with two large wings. *S.*

parviflo'ra, (♄.) fruit unequally and somewhat 4-winged, clavate, small; flowers small. *S.*

HALYME'NIA. 21—4. (*Algæ.*)

palma'ta, frond flat, sub-palmate; divisions oblong, sub-simple; color reddish purple; substance at first thin and membranaceous, at length passing into a soft leathery substance. In the sea.

HAMAME'LIS. 4—2. (*Berberides.*)

virgin''ica, (witch hazel, y. Oct. ♄.) leaves obovate, acute, toothed, cordate with a small sinus Var. *parvifo'lia,* leaves oblong-ovate, upper part undulate, coarse crenate, pubescent, and somewhat hirsute beneath; divisions of the calyx oblong

Blossoms in the fall, and perfects the fruit the next summer. 5-15 f.

HAMILTO'NIA. 20—5. (*Thymeleæ.*)

oleife'ra, (oil-nut, g-y. J. ♄.) pubescent; leaves oblong, entire, acuminate; flowers in terminal racemes, small. Whole plant oily.

HEDEO'MA. 13—1. (*Labiatæ.*)

pulegioi'des, (pennyroyal, b. J. ☉.) pubescent; leaves oblong, serrate; peduncles axillary, whorled. 6-8 i.

hispi'da, (Ju. ☉.) branching, pubescent, leaves linear, acutish at both ends, very entire, veined, revolute at the margin; whorls many-flowered; calyx strigose. 3-6 i. *S.*

bracteo'la, pubescent; stem simple, slender; leaves linear, sub-lanceolate, acute at each end, entire; pedicels 3-5-flowered; bracts setaceous. *S.*

HEDE'RA. 5—1. (*Caprifolia.*) [From *hædus*, a kid.]

he'lix, (English ivy, g-w. S. ♄.) leaves 3-5-lobed; floral ones ovate; umbel erect. Evergreen. Ex.

HEDYO''TIS. 4—1. (*Rubiaceæ.*)

glomera'ta, (w. g. M. ☉.) stem procumbent; leaves opposite, lanceolate, attenuate at the base, pubescent; flowers in clusters, forming whorls.

lanceola'ta, glabrous; stem erect, 4-sided, angles somewhat winged; leaves sessile, lanceolate, acute; stipules lanceolate, membranaceous; corymbs trichotomous, terminal; corol funnel-form, with exsert anthers.

HEDYSA'RUM. 16—10. (*Leguminosæ.*) [From *edus*, sweet, *aroma*, smell.]

panicula'tum, (p. Ju. ♃.) erect; leaves ternate, lance-linear, smoothish, revolute at the margin; stipules subulate; panicle terminal; loment hispid; joints somewhat triangular. 2-3 f.

stric''tum, (p. Ju. ♃.) stiffly erect, glabrous, simple; leaves ternate, sub-linear, net-veined; stipules subulate; racemes axillary and terminal; loments about 2-jointed; joints ternate-triangular, hispid. 2-3 f.

nudiflo'rum, (p. Ju. ♃.) leaves ternate, broad-oval, acuminate, sub-glaucous beneath; scape panicled, glabrous, radical, taller than the stem; joints of the loment round-triangular. 1-2 f.

viridiflo'rum, (g. and p. Au. ♃.) stem erect, branched, scabrous; leaves ternate, ovate, obtuse, scabrous above, villose, and very soft beneath; panicle terminal, very long, naked; joints of the loment triangular. 3 f.

rotundifo'lium, (p. Au. ♃.) stem prostrate, hairy; leaves ternate; joints of the loment sub-rhomboidal. 2-4 f.

acumina'tum, (p. Ju. ♃.) erect, simple, pubescent; leaves ternate, ovate, conspicuously acuminate, a little hairy; panicle terminal, on a very long, naked peduncle; joints of the loment roundish. 1-2 f.

canaden''se, (bush trefoil, r. Ju. ♃.) erect, smoothish; leaves ternate, lance-oblong; stipules filiform; flowers racemed; bracts lance-ovate, acuminate, ciliate; joints of the loment obtusely triangled, hispid. 3 f.

borea'le, leaves pinnate, leafets oblong-ovate, hairy; stipules sheathing, subulate; racemes on long peduncles; loments with smooth, roundish joints. (p. Ju. ♃.) Mountains.

obtu'sum, (p. and g. Au. ♃.) erect, slender, sub pubescent; leaves ternate, ovate, obtuse, sub-cordate at the base; stipules subulate; panicle terminal; joints of the loment sub-orbiculate, reticulate, hispid. 1-2 f.

linea'tum, (♃.) stem creeping, striped with green; leaves ternate, roundish, sub-sessile; racemes long, with small scattered flowers; joints of the loment lenticular *S.* See DESMO'DIUM.

HELE'NIUM. 17—2. (*Corymbiferæ.*) [From *Helena*, wife of Menelaus, king of Sparta.]

autumna'le, (false sun-flower, y. Au. ♃.) leaves lanceolate, serrate, sub-decurrent; stem corymbed above; disk florets 5-cleft rays flat, reflexed. Var. *pubes''cens,* leaves pubescent. 3-5 f

HELIAN''THEMUM. See CIS''TUS.

HE'LIAN''THUS. 17—3. (*Corymbiferæ.*) [From *elios*, the sun, *anthos*, flower, on account of its broad yellow disk and rays; and not, as is often supposed, from its turning with the sun, which is not the fact with respect to this flower.]

angustifo'lius, (y. and p. O. ♃.) stem slender, slightly scabrous; leaves narrow lanceolate, revolute at the margin, scabrous, entire, glaucous beneath; scales of the calyx lance-linear, ciliate, expanding; chaff 3-toothed. 3-5 f.

mol''lis, (y. Ju. ♃.) stem smooth below, scabrous above; leaves lance-ovate, acute serrate, scabrous above, pubescent and hoary beneath; flowers few, terminal. 3-6 f.

pauciflo'rus, (y.) leaves lance-linear, acuminate, serrate, smoothish; stem naked, trichotomous, few-flowered; calyx close-imbricate; divisions ovate. 4-5 f. *S.*

trachelifo'lius, (y. Au. ♃.) leaves ovate-lanceolate, opposite acuminate, serrate triply-nerved, very scabrous on both sides; scales of the calyx lance-linear, ciliate; outer ones longest. 3-4 f.

decapeta'lus, (y. Sept. ♃.) leaves ovate acuminate, remotely serrate, 3-nerved, scabrous; scales of the calyx lanceolate, sub-equal, sub-ciliate; rays 10 or 12. Flowers in large terminal panicles.

gigan''teus, (y. Sept. ♃.) leaves alternate, lanceolate, serrate, scabrous, paler beneath, nearly sessile, ciliate at the base; scales of the calyx lanceolate, ciliate; flowers in a loose, terminal panicle; rays 12-14, not large. 5-6 f.

atroru'bens, hispid, stem naked toward the summit, loosely paniculate; leaves opposite, spatulate, oblong-ovate, crenate. 3-nerved, scabrous on the upper side; scales of the calyx ovate-lanceolate, as long as the disk; rays yellow; disk dark purple.

corona'rium, French honeysuckle, a native of Italy. 4 f. Flowers scarlet. Ex.

tubero'sus, (Jerusalem artichoke, y. S. ♃.) leaves 3-nerved, scabrous; lower ones heart-ovate, upper ones ovate, acuminate petioles ciliate; root tuberous. Naturalized. 4-8 i.

an''nuus, (common sun-flower, y. and w. Ju. ♃.) leaves all cordate, 3 nerved; peduncles thickening upward; flowers nodding. 6-10 f. Naturalized.

pubes''cens, (y. Au. ♃.) hoary-pubescent; stem villose; leaves sessile, heart-ovate, clasping, 3-nerved, crenulate, very soft; scales of the involucre lanceolate, villose. 2-3 f. *S.*

longifo'lius, (y. S. ♃.) very glabrous; stem panicled; branches few-flowered at the summit; leaves sub-sessile, very long-lanceolate, 3-nerved, very entire; lower ones serrate; scales of the involucre ovate, acute; outer ones linear, divaricate. 4-7 f. *S.*

tomento'sus, (y. S. ♃.) stem rough; leaves lance-ovate, tapering to the summit, acute, serrulate, scabrous above, tomentose beneath, generally alternate; scales of the involucre leafy, squarrose-lanceolate; chaff 3-cleft. 4-6 f. *S.*

HELIOP''SIS. 17—2. (*Corymbiferæ.*) [From *elios*, the sun, *opsis*, appearing like.]

læ'vis, (ox-eye, Ju. ♃.) stem glabrous; leaves opposite, ovate, serrate, 3-nerved, smooth. 3-5 f.

sca'bra, (W.) leaves shortly petioled, ovate, 3-nerved, deeply serrate, apex very entire, both sides scabrous; involucre pubescent.

HELIOTRO'PIUM. 5—1. (*Boragineæ.*) [From *elios*, the sun, *trope*, turning; a name given by Dioscorides, because, as he says, the flower turns with the sun.]

in''dicum, (turnsole, b. Ju. ☉.) leaves heart-ovate, acute, roughish; spikes solitary; fruit bifid. 8-12 i. *S.*

curassavi'cum, (y. w. J. ☉.) leaves lance-narrow-lanceolate, succulent, glabrous, without veins; spikes conjugate. 6-12 i. *S.*

europæ'um, (w. ☉.) leaves ovate, very entire, tomentose, rugose spikes conjugate. Inodorous. *S.*

HELLEBO'RUS. 12—12. (*Ranunculaceæ.*) [From *ellein*, destructive of life, *bora*, food, from its poisonous qualities.]

fœ'tidus, (hellebore,) stem many-flowered, leafy; leaves pedate, remotely serrate, coriaceous; corolla somewhat converging.

HELO'NIAS. 6—3. (*Junci.*)

angustifo'lia, (J. ♃.) scape leafy; leaves linear, subulate; raceme simple, terminal; capsules oblong, covering at the summit; seeds linear. 2 f.

latifo'lia, (p-b. M. ♃.) scales leafless; spike ovate, crowded; bracts linear-lanceolate; leaves lanceolate, mucronate, nerved.

diœ'cia, scape leafy; leaves lanceolate, broader near the root; racemes diœcious, spiked; pedicels very short, without bracts; segments of the perianth linear; stamens exserted; flowers white, in a terminal, spiked raceme. Unicorn plant. Blazing star. 2 f.

du'bia, leaves very long and narrow, grass-like; scape naked; spike slender; flowers small, sessile. 2-3 f. *S.*

HEMEROCAL''LIS. 6—1. (*Asphodeli.*, [From *emera*, day, and *kallos*, beauty, beauty of the day.]

fla'va, (yellow day-lily, y. Ju. ♃.) leaves broad-linear, keeled; petals flat, acute nerves of the petals undivided. Ex.

ful''va, leaves very long, linear, carinate, three inner petals obtuse, undulate; nerves of the outer petals branching; flowers large, fulvous; scape 3-4 f. Introduced. Tawny day-lily.

japon''ica, (w. Au.) leaves cordate, acuminate; corol funnel-shaped. Japan.

HEMIAN''THUS. 2—1. (*Scrophulariæ.*)

micran''tha, (w. Au. ☉.) leaves opposite, crowded, sessile, obscurely 3-nerved, glabrous; succulent stem creeping, dichotomous; flowers axillary, solitary, minute Banks of rivers.

HEPAT''ICA. 2—12. (*Ranunculaceæ.*) [From *epar*, the liver; probably from the belief that it was of use in complaints of this organ.]

acutil''oba, or *triloba*, (heart liverleaf, w. and p. Ap. ♃.) leaves cordate, 3-5 lobed; lobes entire, acute; leaves of the calyx acute. Grows in woods, preferring the north side of hills and mountains. 5 i.

america'na, (kidney liverleaf, w. and p. Ap. ♃.) leaves heart-reniform, 3-lobed; lobes entire, round-obtuse; leaves of the calyx obtuse. Grows chiefly in woods, preferring the south side of hills and mountains. 5 i.

HERAC''LEUM. 5—2. (*Umbelliferæ.*) [Named either from Hercules, or the city of Heraclea, near which it grew.]

lana'tum, (cow-parsnip, w. Ju. ♃.) leaves ternate, petioled, tomentose beneath; leafets round-cordate, lobed; partial involucres 5-6 leaved; fruit orbicular. One of our largest umbelliferous plants, with a white, woolly aspect. Flowers white, in very large, terminal umbels. Poisonous.

spondyli'um, leaves pinnate; leafets 5, oblong *S.*

HERPES''TIS. 13—2. (*Scrophulariæ.*) [From *erpo*, creeping.]

cuneifo'lia, (b. Au. ♃.) very smooth; leaves opposite, cuneate-obovate; peduncles as long as the leaves; corolla 5-cleft stem creeping.

rotundifo'lia, (b. Au.) finely pubescent, leaves oval, roundish, many-nerved; peduncles opposite, as long as the leaves; corolla 4-cleft. *S.*

amplexicau'lis, (Au.) stem woolly; leaves cordate, clasping, entire, obtuse; peduncles shorter than the leaves; corolla 4-cleft. *S.*

HES''PERIS. 14—2. (*Cruciferæ.*) [From *esperos*, evening.]

pinnatifi'da, (p. J. ♂.) lower leaves lyrate, pinnatifid, upper ones lanceolate, unequally serrate; borders of the petals obovate, entire; pedicel becomes longer than the calyx; stem smooth. 1 f.

matrona'lis, (dame's violet, sweet rocket p-w.) pedicels of the length of the calyx; petals obovate; leaves ovate lanceolate, toothed. Ex.

pygmæ'a, (p. ☉.) leaves lance-linear, attenuate at the base, entire, or dentate; pubescence 2-parted, appressed; siliques numerous, erect, compressed, pubescent; stem erect, simple.

menzie'sii, (♃.) leaves spatulate, fleshy; pubescence 2-parted, appressed; siliques spreading (when young); stem very short, erect, simple.

tris"tis, (yellow rocket, ♂.) stem hispid; branches spreading. Ex.

HETERANTHE'RA. 3—1. (*Narcissi.*) [From *eteros*, other or different, and *aner*, anther, because the anthers are of different sizes in the same flower.]

renifor"mis, (Ju. Aug. w. ♃.) leaves orbicular, reniform; spatha oblong, acuminate, 3-5 flowered.

HEUCHE'RA. 5—2. (*Saxifragæ.*) [Heucher.]

america'na, (alum-root, r. Ju. ♃.) viscidly-pubescent; scape and leaves somewhat scabrous; leaves radical, on long, pubescent petioles; flowers in a long, terminal panicle; stamens exserted; calyx short, obtuse; petals lanceolate, as long as the calyx. 2-3 f.

pubes"cens, dusty-pubescent; calyx large, bell-form; stamens scarcely exserted; flowers large, red and yellow.

his"pida, (p. J. ♃.) hispid, scabrous; scape, petioles, and leaves, glabrous beneath; leaves hispid-pillose above, acute-lobed, toothed; teeth very short, sub-retuse, mucronate; peduncles of the panicle few-flowered; calyx shortish, sub-acute; petals spatulate, as long as the calyx; stamens exsert.

caules"cens, (w. J. ♃.) suffruticose at the base; scape at the base, and petioles pilose; leaves glabrous above, pillose at the nerves beneath, acutely lobed, ciliate, dentate; teeth acute, mucronate; calyx short, villose; petals linear, twice as long as the calyx; stamens exsert.

acerifo'lia, (♃.) petioles hirsute; leaves smooth, glaucous beneath, acutely 5-lobed, unequally toothed; teeth mucronate; scape smooth; panicle elongated, lax-flowered; petals short; stamens exsert.

HIBIS"CUS. 15—12. (*Malvaceæ.*) [From *ibis*, the stork, which is said to be fond of it.]

phœni'ceus, (phœnicean mallows, r. Ju. ♃.) leaves ovate, acuminate, serrate, and crenate, lower ones 3-cuspidate; peduncles jointed; seeds woolly. 6-8 f. Ex.

milita'ris, (w-r. Au. ♃.) very glabrous; leaves 3-lobed, hastate, acuminate, serrate corolla tubular, campanulate; capsule ovate, acuminate, glabrous; seeds silky. 3-4 f.

virgin"icus, (sweat-weed, r. Au. ♃.) downy, rough; leaves acuminate, unequally toothed, lower ones cordate, undivided, upper ones cordate-oblong, 3-lobed; peduncles axillary, and in terminal racemes; flowers nodding; pistils nodding. 2-4 f.

syr"iacus, (althea frutex, w. and p. Au. ♄.) leaves wedge-ovate, 3-lobed, toothed; outer calyx about 8-leaved, of the length of the inner. 5-10 f. Ex.

esculen"tus, (okra, y. Ju. ⊙.) leaves heart-5-lobed, obtusish, toothed; petiole longer than the flower; outer calyx about 5-leaved, caducous, bursting lengthwise. 3-5 f. Ex.

trio'num, (beautiful ketmia, flower of an hour, ⊙.) flowers yellowish-white, with the lower part purple; calyx inflated leaves toothed. Ex.

moscheu'tus, (marsh mallows, w-p. Au. ♃.) leaves tomentose beneath; petioles bearing the peduncles; calyx tomentose. Swamps. Flowers large, white, with a purple centre.

grandiflo'rus, leaves large, coriaceous, 3-lobed, tomentose on both sides, hoary beneath; flowers large, red. 5-7 f. *S.* Ex

inca'nus, (y-w. S. ♃.) leaves ovate, acuminate, obtusely serrate, hoary-tomentose on both sides; peduncles axillary; calyx tomentose, nearly equal.

coccin"eus, (r. Au. ♃.) very glabrous leaves palmate-5-parted; divisions lance-linear, acuminate, remotely serrate at the apex; capsule ovate, glabrous. 4-8 f. *S.*

sca'ber, (y. and p. Au. ♃.) stem scabrous; lower leaves cordate, angled, upper ones palmate, 3-5 lobed; lobes irregular, dentate, angled; calyx very hispid, twice as long as the bracts. 3 f. *S.*

carolin"ia'nus, (p. Au. ♃.) leaves cordate, ovate, acuminate, serrate, smooth on both sides, sometimes sub-3-lobed; seeds hispid. 4-6 f. *S.*

vesica'rius, (African hibiscus, y-p. ⊙.) 2 f.

HIERA'CIUM. 17—1. (*Cichoraceæ.*) [From *hierax*, a hawk.]

marian"um, (O. y. Ju. ♃.) stem erect, villose; leaves oval-obovate, strigose, villose on the keel, lower ones sub-dentate; peduncles and involucre downy. 1-2 f.

runcina'tum, hirsute; leaves radical, oval-oblong, runcinate; scape few-flowered, angular; involucre glandular-pilose. 1 f. *S.*

grono'vii, (y. Ju. ♃.) scape leafy, naked above, corymb-panicled; calyx and peduncles glandular-pilose; radical leaves obovate and lanceolate, ciliate, very pubescent. Var. *nudicau'le*, stem about 1-leaved; panicle somewhat fastigiate. 2-3 f.

panicula'tum, (y. Ju. ♃.) somewhat glabrous; stem erect, leafy, panicled, white-woolly below; pedicels capillary; leaves lanceolate, naked, toothed, membranaceous. 2-4 f.

fascicula'tum, somewhat glabrous; stem erect, leafy, simple, glabrous; leaves sessile, oblong, acute, sharply toothed; teeth elongated; branches of the panicle divaricate, short; pedicels pubescent, somewhat fascicled.

macrophyl"lum, (y. ♃.) very tall; stem erect, leafy, hispid, sulcate; leaves cordate, half-clasping, ovate-oblong, remotely coarse-toothed, nearly naked; nerves and veins pubescent beneath; panicle divaricate-corymbed; peduncles elongated, naked, glabrous; calyx glabrous.

veno'sum, (vein-leaf hawkweed, y. Ju. ♃.) scape naked, corymb-panicled, glabrous; leaves lance-obovate, with thin hairs above, and naked beneath, margin ciliate, glandular-toothed, veins colored calyx glabrous. 1-2 f.

auranti'acum, (orange hawkweed, y. ♃.) scape leafy, hispid; flowers corymbed; peduncles glomerate; leaves oblong, acutish, pilose-hispid. Ex.

kal"mii, (y. Au. ♃.) stem erect, sub-villose; leaves sessile, lanceolate, acuminate, sharply and divaricately toothed; panicle sub-corymbose; pedicels downy. 2 f.

HIPPO'PHÆ. 20—8. (*Æleagni.*) [From *ippos*, a horse, *phao*, to destroy.]

canaden"sis, (sea buckthorn, M. ♄.) leaves ovate, nearly smooth above, argenteus beneath. 6-8 f.

argen"tea, both sides of the leaves covered with silver scales. 12-18 f.

HIPPU'RIS. 1—1. (*Naides.*) [From *ippos*, a horse, *oura*. tail.]

vulga'ris, (mare's-tail, y-g. M. ♃.) leaves linear, and lance-linear, verticillate.

monta'na, leaves in sixes, linear, acute.

mariti'ma, leaves in fours or sixes, lanceolate, obtuse, scarcely gangrenous. 9-18 i.

HOL"CUS. 3—2. (*Gramineæ.*) [From *olkos*, the Greek name of a plant with awns like barley.]

lana'tus, (soft-grass, w. Ju. ♃.) perfect floret inferior and awnless, sterile one with a curved awn included in the glume; root fibrous; culm 18 inches high; panicle oblong, contracted, whitish.

HO'PEA. 15—12. (*Malvaceæ.*) [Dr. John Hope.]

tincto'ria, (sweet leaf, y. Ap. ♄.) leaves lance-oblong, glaucous, pubescent beneath; flowers sessile, axillary, in clusters. 15-18 f.

HOR"DEUM. 3—2. (*Graminæ.*)

juba'tum, (J. ♂.) lateral florets abortive; awns of the calyx and corolla 6 times as long as the flowers. 2 f.

vulga're, (barley, Ju. ☉.) florets all perfect, awned, in two erect rows. Ex.

dis"tichon, (J. ☉.) lateral florets imperfect, awnless; seeds angular, imbricate. Ex.

pusil"lum, lateral florets staminate or neuter, awnless, acute; four inner glumes coriaceous, dilated, all short-awned; awns scabrous, decumbent. 4-6 i.

HORTEN"SIA. 10—3. (*Caprifolia.*)

specio'sa, (changeable hydrangea, r. and w. J. ♄.) leaves broadly ovate, serrate, acuminate; flowers corymbed. From the East Indies. This is the common flower-pot shrub called hyderindia, and by corruption of this word hydrangea.

HOTTO'NIA. 5—1. (*Lysimachiæ.*) [John Hotton.]

infla'ta, (water-feather, Ju. ♃.) stem thick, generally submersed; scape jointed; flowers whorled, on peduncles; leaves long, pectinate. Stagnant waters.

HOUSTO'NIA. 4—1. (*Gentianæ.*) [Dr. Houston.]

serpyl"lifolia, (b. M. ♃.) procumbent, cespitose; leaves spatulate, obtuse; peduncles terminal, 1-flowered, very long.

tenel"la, (b. J. ♃.) stem creeping, filiform; leaves round, acute, nerved; peduncles terminal, 1-flowered, very long, smaller than the last.

rotundifo'lia, (w. Ap. ♃.) creeping; leaves ovate, roundish, abruptly narrowed at the base; peduncles axillary, solitary, 1-flowered; leaves evergreen.

ciliola'ta, (p.) radical leaves ovate, obtuse, narrow at the base, ciliate at the margin, cauline ones ovate-spatulate, sessile; corymbs terminal, pedicelled; peduncles trichotomous; divisions of the calyx lance-linear, stem smooth, branched above.

pubes"cens, leaves wedge-form, acute, pubescent, lower ones sub-petioled, lanceolate, upper ones sub-oval, sessile; panicle trichotomous, terminal.

pa'tens, (p. Mar. ☉.) small; stem branching, dichotomous, with scabrous angles; flowers solitary, terminal, and axillary. 1 2 i.

cæru'lea, (innocence, Venus'-pride, b. and w. M. ♃.) stem erect, setaceous, dichotomous; radical leaves spatulate, cauline ones oblanceolate, opposite; peduncles 1-flowered, elongated. 4-6 i.

longifo'lia, (b-w.) leaves narrow; flowers terminal, nearly sessile.

purpu'rea, purple flowers in terminal corymbs.

HOY'A. 18—5. (*Apocyneæ.*)

carno'sa, (w-r.) leaves ovate; flowers bearded, wax-like, distilling a honey-like fluid. A vine.

HUDSO'NIA. 12—1. (*Cesti.*)

ericoi'des, (false heath, y. J. ♄.) pubescent; stem suffruticose, sub-erect; branches elongated; leaves filiform, subulate; peduncles lateral, elongated; calyx cylindrical, obtuse; capsule pubescent; 1-seeded. 4-6 i. Pine barrens.

tomento'sa, hoary-pubescent. Sea-shore.

monta'na, decumbent, smoothish, cespitose; leaves long, filiform-subulate, sub-imbricate; peduncles terminal, solitary; calyx bell-form, woolly; capsule villose. 3-5 i. *S.*

HU'MULUS. 20—5. (*Urticæ.*) [From *humus*, the ground, because, without support, it trails on the ground.]

lu'pulus, (hop, g-y. Au. ♃.) stem twining with the sun; leaves lobed. One of the best of tonics.

HYACIN"THUS. 6—1. (*Asphodeli.*) [Said to have been named from the friend of Apollo, who, according to the poets, was changed into this flower.]

orienta'lis, (garden hyacinth, r. Ap. ♃.) corolla funnel-form, half 6-cleft, ventricose at the base. Ex.

mus"cari, (musk hyacinth, r. Ap. ♃.) corollas ovate, all equal. Ex.

botryoi'des, (grape hyacinth, b. Ap. ♃.) corollas globose, uniform; leaves cylindric, channelled, straight. Ex.

racemo'sus, (hare-bell hyacinth,) flowers thick, ovate, those at the top sessile; leaves lax-pendent, linear.

como'sus, (purple grape-hyacinth,) corollas angular-cylindric; upper flowers long peduncled.

HYDRAN"GEA. 10—2. (*Saxifragæ.*) [From *udor*, water, and *aggeion*, a vessel, in allusion to the shape of the seed-vessel.]

vulga'ris, (hydrangea, w. Au. ♄.) leaves oblong-ovate, obtuse at the base, acuminate, glabrous beneath; cymes naked. 4 f.

radia'ta, leaves cordate, serrate, tomentose, and white beneath; cymes terminal, radiate; flowers white, very ornamental. Shrub. 6 f. For the cultivated hydrangea, see HORTEN'SIA.

corda'ta, (M. J. ♃.) leaves broad ovate slightly cordate at base, acuminate, coarsely toothed, glabrous underneath; cymes generally radiate.

quercifo'lia, (w-r. M. J.) leaves oblong, sinuate and lobed, dentate, tomentose underneath; cymes radiate, paniculate. 4-5 f.

HYDRAS''TIS. 12—12. (*Ranunculaceæ.*) [From *udor*, water.]

canaden''sis, (yellow pucoon, w-r. Ap. ♃.) stem with two opposite leaves above; leaves petioled, emarginate at the base, palmate, serrate, gashed; peduncle terminal, solitary, 1-flowered; roots yellow. Used by the Indians as a dye.

HY'DROCHA'RIS. 20—9. (*Hydrocharides.*) [From *udor*, water, and *charis*, grace, this little plant being considered as ornamental to placid waters.]

spongio'sa, monœcious, leaves floating, round, cordate, reticulate underneath, with vesicles at base.

HYDROCHLO'A. 19—6. (*Gramineæ.*) [From *udor*, water, and *elaia*, oil, because the leaves have a very oily appearance.]

flui'tans. (Ju. ♃.) floating in water, culm long, slender, branching; leaves linear, flat; spike solitary, axillary, setaceous; about 4-flowered.

HYDROCOT''YLE. 5—2. (*Umbelliferæ.*) [From *udor*, water, *kotule*, a cavity.]

umbella'ta, (w. M. ♃.) leaves peltate, crenate, emarginate at base; umbels many-flowered, on long peduncles.

vulga'ris, (g-w. J. ♃.) leaves orbicular, peltate, slightly crenate; scape interruptedly spiked, few-flowered.

ranunculoi'des, (Ju. ♃.) creeping; glabrous; leaves orbicular-reniform, somewhat 5-lobed; lobes obtuse, crenate, the middle one smaller and more distinct; umbels subcapitate, few-flowered; pedunculate, 5 to 10-flowered.

america'na, root tuberous; stem filiform, with creeping suckers; leaves reniform, slightly 7-lobed, crenate; umbels 4-6 flowered, axillary; petals greenish-white. Wet places.

interrup''ta, stem creeping at the joints; leaves peltate; flowers pinnate, white, in small umbels, much shorter than the petioles. Marsh penny-wort.

HYDRO'LEA. 5—2. (*Convolvuli.*) [From *udor*. water, *elaia* oil.]

quadrival''vis, (b. Ju. ♃.) spinose, pilose; leaves long-lanceolate; flowers nearly sessile, axillary.

corymbo'sa, without spines, flowers terminal.

spino'sa, leaves lanceolate, hirsute; flowers terminal. *S.*

HYDROPEL''TIS. 12—12. (*Ranunculaceæ.*) [From *udor*, water, *pelte*, a shield.]

purpu'rea, (water-shield, p. Au. ♃.) leaves peltate, tinged with purple; peduncles solitary, 1-flowered. Whole plant covered with a viscid gelatine; stem long, floating.

HYDROPHYL''LUM. 5—1. (*Boragineæ.*) [From *udor*, water, *phyllum*, a leaf.]

virgini'cum, (water leaf, w. J. ♃.) smoothish; leaves pinnatifid and pinnate; segments with deep serratures; clusters of flowers crowded; peduncles larger than the petioles. 18 i.

canaden''se, somewhat hairy; leaves large, about 5-7-lobed; flowers blue and white, in clusters.

linea're. (Ap. ♃.) pilose; leaves linear racemes elongated. *S.*

HYOSCYA'MUS. 5—1. (*Solanæ.*) [From *sus*, a swine, and *kuamos*, a bean, because the plant is unsightly.]

ni'ger, (hen-bane, y-p. Ju. ♂.) leaves clasping, sinuate; flowers veiny, sessile. Introduced.

HYPER''ICUM. 12—5. (*Hypericæ.*) [From *uper*, over, *eikon*, evil spirits, because it was thought to have power over such.]

corymbo'sum, (y. Ju. ♃.) erect, glabrous darkly-punctate; stem terete, branching leaves clasping. oblong-oval, obtuse; corymbs terminal. brachiate, dense-flowered divisions of the calyx lanceolate, acute 18-24 i.

parviflo'rum, (y. Ju. ♃.) erect, small, glabrous; stem dichotomous-ramose, somewhat 4-sided; leaves ovate oblong, subcordate, obtuse, nerved, sessile; panicles terminal, dichotomous-corymbed; petals shorter than the lanceolate calyx. 6-12 i.

perfora'tum, (y. J. ♃.) erect, branching; stem 2-edged; leaves oblong, obtuse, transparently punctate; panicle terminal, brachiate, leafy; petals twice as long as the acute, lanceolate calyx; 3 styles. St. John's wort.

virgin''icum, (p. Au. ♃.) flowers with 9-12-stamens, distinctly arranged in 3 parcels, and separated by nectaries; 3 styles; leaves oval, obtuse, clasping; stem compressed. 1-2 f.

ascyroi'des, smooth; stem square, winged at the base; leaves sessile, acute; styles free, as long as the stamens; flowers and leaves large; capsules nearly as large as nutmegs, yellow. River banks.

puncta'tum, stem terete; leaves subclasping; flowers in dense corymbs; styles 3, longer than the stamens. Whole plant dotted with black.

canaden''se, erect, small, few-flowered; stem 4-sided, dichotomous above; leaves sessile, linear; capsules red. 9-19 i.

kalmia'num, (laurel-leaved hypericum,) shrubby, very branching corymbs terminal. 3-4 f. Cultivated as ornamental.

prolifi''cum, leaves more narrow than the preceding; flowers smaller, numerous. Cultivated.

HYPOPEL''TIS. 21—1. (*Filices.*) [From *upo*, under, and *pelte*, a shield.]

obtu'sa, (Au. ♃.) fronds 8-14 inches, high. bi-pinnate; divisions sub-remote; segments oblong, the lower ones crenate-dentate; rachis pubescent above. Rocky woods.

HYPOX''IS. 6—1. (*Narcissi.*)

erec''ta, (star-grass, y. Ju. ♃.) pilose; scape 2-3-flowered; leaves lance-linear; divisions of the corolla lance-oblong. Var *gramin''ea*, has longer and narrower leaves; more flowers, longer lance-linear divisions to the corolla, and altogether a more grassy appearance.

filifo'lia, (Ap.) leaves filiform, somewhat angled, hairy scape generally 2-flowered. *S.*

junce'a, (J. ♃.) pilose; leaves filiform, channeled very entire; scapes 1-flowered. *S.*

HYP''TIS. 13—1. (*Labiatæ.*)

radia'ta, (w. Au. ♃.) heads of flowers opposite; peduncles as long as the internodes; bracts lanceolate; leaves oblong, serrate.

HYSSO'PUS. 13—1 (*Labiatæ.*) [A Hebrew name.]

nepetoi'des, (giant hyssop, g-y. Ju. ♃.) stem acutely 4-angled; leaves opposite; calyx small; bracts dilated. Woods. 3-6 f.

officina'lis, (garden hyssop,) flowers whorled; leaves lance-linear.

IBE'RIS. 14—1. (*Cruciferæ.*) [From *Iberia*, the ancient name of Spain.]

umbella'ta, (purple candy-tuft,) leaves lanceolate, acuminate; lower ones serrate, upper ones entire. Ex.

ama'ra, (white candy-tuft,) leaves irregularly dentate, narrow towards the base, somewhat spatulate, fleshy. 1 f. Ex.

ICTO'DES. 4—1. (*Aroideæ.*) [From *iktis*, a skunk.]

fœ'tida, (skunk cabbage, fetid hellebore, p. Ap. ♃.) stemless; leaves radical, heart-ovate; very large spadix supporting the flowers in a sub-globose head. Odor resembles that of a skunk.

I'LEX. 4—4. (*Rhamni.*)

opa'ca, (evergreen holly, g-w. M. ♄.) leaves evergreen, ovate, acute, spinose, glabrous, flat; flowers scattered at the base of the shoots of the preceding year. A middle-sized tree.

canaden''sis, (mountain holly, g-y. M. ♄.) leaves deciduous, ovate, glabrous 3-5 f.

vomito'ria, leaves oval-obtuse obtuse at each end, glabrous; umbels lateral, sub-sessile. 6-15 f. *S.*

laxiflo'ra, (J. ♄.) leaves ovate, sinuate-toothed, spinose, shining, flat; peduncles super-axillary, in the young branches aggregate, lax-ramose. *S.*

cas''sena, (Mar. Ap. ♄.) leaves oval, obtuse at each end, crenately serrate. 6-15 f. *S.*

laurifo'lia, (leaves large, elliptic, acutish, very entire, sempervirent; pedicels elongated, sub-3-flowered. *S.*

myrtifo'lia, (M. ♄.) leaves linear-lanceolate, mucronate, rigid, very glabrous; fertile flowers solitary. 6-10 f. *S.*

ligus''trina, (J. ♄.) leaves linear-lanceolate, cuneate at the base, generally entire; fertile flowers solitary. 6-10 f. *S.*

ILLI'CIUM. 12—12. (*Lauri.*)

parviflo'ra, (y. M. ♄.) leaves alternate, lanceolate, entire, perennial; petals and sepals round, concave. 6-10 f. *S.*

florada'num, flowers purple; leaves acuminate; petals numerous, oblong, and linear. *S.*

IMPA'TIENS.[*] 5—1. (*Geraneæ.*)

pal''lida, (jewel-weed, touch-me-not, Ju. ☉.) peduncles solitary, 2-4-flowered, calcarate petals conic, dilated, shorter than the rest; spur recurved, very short; flowers sparingly punctate; leaves rhomb-ovate, mucronate-toothed. 2-4 f.

ful''va, (speckled jewel-weed, y-r.) peduncles solitary, 2-4-flowered; leaves rhombic-ovate; mucronate-dentate; calcarate petal longer than the rest; flowers with crowded spots.

balsami'na, (garden ladies'-slipper,) peduncles aggregate, 1-flowered; leaves lanceolate, upper ones alternate; calcarate petal (or nectary) shorter than the other petals. Of various colors. 1-3 f.

INDIGOFE'RA. 16—10. (*Leguminosæ.*) [From *fero*, to bear, added to indigo.]

tincto'ria, (indigo, ♄.) leaves pinnate, oblong, glabrous, in 4 pairs; racemes shorter than the leaves; legume terete, somewhat arched. Ex.

carolin''ia'na, (b. Au. ♃.) leaves pinnate, leafets oval and obovate; spikes longer than the leaves; pods 2-seeded, reticulate, veiny. 3-7 f. *S.*

INU'LA. 17—2. (*Corymbiferæ.*) [Fabled to have sprung from the tears of Helen.]

hele'nium, (elecampane, Au. ♄.) leaves clasping, ovate, rugose, tomentose beneath; scales of the calyx ovate. Naturalized. 3-5 f.

IONI'DIUM. 5—1. (*Cisti.*) [*Ion*, violet, from the resemblance.]

con''co'lor, (green violet, w-g. M. ♃.) straight, erect; leaves broad-lanceolate, sub-entire; stipules subulate entire; peduncles short; petals connivant; emarginate; spur 0. 20 i.

IPO'MEA. 5—1. (*Convolvuli.*) [From two Greek words, signifying like a vine.]

nil, (morning-glory, b. Ju. ☉.) hirsute; leaves cordate, 3-lobed; peduncles short, 1-3-flowered; calyx very villose, long, acuminate.

bona'nox, (w. Ju. ☉.) very glabrous, leaves cordate, entire or angled; peduncles 1-3-flowered; calyx awned; corolla undivided, tube long. *S.*

coccin''ea, (scarlet morning-glory, y-r. ☉.) pubescent; leaves cordate, acuminate; peduncles about 5-flowered; corolla tubular West Indies.

quam''oclit, (crimson cypress-vine, r-w.) leaves pinnatifid, linear; flowers sub-solitary, corolla tubular; dark red. East Indies.

lacuno'sa, (starry ipomea, w-p.) glabrous; leaves cordate, acuminate; peduncles short, about 1-flowered; calyx hairy.

dissec''ta, (Ju. ♃.) stem, petioles, and peduncles very pilose; leaves glabrous, 7 lobed; divisions sinuate; peduncles 1-flowered; divisions of the calyx oval; corol bell-form. *S.*

trichocar''pa, (p. Ju. ☉.) leaves entire, cordate, or 3-lobed, villose; calyx ciliate, capsules hirsute; peduncles about 2-flowered. *S.*

caroli'na, (b.) leaves digitate; leafets petioled · peduncles 1-flowered. *S.*

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[*] The capsules are remarkable for bursting open with an elastic spring, at the slightest touch, hence the generic name Impatiens

IRIS. 3—1. (*Iridæ.*) [From *iris*, the rainbow.]

crista'ta, (b-y. Ap. ♃.) bearded; beard crested; scape generally 1-flowered, as long as the leaves. 2-4 f. *S.*

tri'pet''ala, (E. M. ♃.) bearded; stem terete, longer than the leaves; rudiments of the inner petals 3-toothed, middle tooth acuminate. 2 f. *S.*

cupre'a, (r-y.) beardless; stem terete, flexuous, equalling the leaves; capsules large, 6-angled. 3 f. *S.*

ver''na, (b. M.) without beard or stem; 1-flowered; leaves grass-like; tube very long. On the earth. *S.*

prismat''ica, (b. y. J. ♃.) flowers beardless; leaves linear; stem round, many-flowered; germs triangular, twice grooved on the sides. 1-2 f.

plica'ta, (garden iris, p. w. M. ♃.) bearded; stem many-flowered, higher than the leaves; petals undulate-plicate, erect ones broadest. 18-24 i. Ex.

pu'mila, (dwarf flower-de-luce, b. M. ♃.) bearded; scape 1-flowered; leaves ensiform, glabrous; tube of the corolla exsert; petals oblong, obtuse. 6-10 i. Ex.

ochroleu'ca, (yellow iris, y. M.) beardless; leaves ensiform, depressed, striate; scape sub-terete; germ 6-cornered. Ex.

versic''olor, (snake-lily, blue-flag, b. J. ♃.) leaves ensiform; stem acute on one side; capsules oblong, 3-sided, with obtuse angles. Var. *sulca'ta*, inner petals longer than the stigmas; germ with sulcate angles and concave sides; capsule oblong, ventricose; angles somewhat furrowed. Var. *commu'nis*, stem erect, flexuous; leaves narrow-ensiform; inner petals a little shorter than the stigmas; angles of the germ not grooved when young, sides deep concave; capsule cylindric, oblong. 2-3 f.

lacus''tris, (b. ♃.) beardless; leaves short-ensiform; scape much shorter than the leaf, 1-flowered; petals attenuated on the tube; capsule turbinate, 3-sided, margined; seed roundish, smooth; root tuberous.

missou'riensis, (y. b. ♃.) beardless; stem terete, higher than the leaves, somewhat 3-flowered; leaves narrow, ensiform; capsules oblong-linear; flowers bicolored. 12-16 i.

sam''buci'na, (elder-scented iris, garden-iris, b. p. w. M. ♃.) stem many-flowered, higher than the leaves; divisions of the corolla emarginate, outer ones flat; leaves inflex-falcate at the apex; spatha membranaceous at the apex; lower flowers peduncled; stigmas with acute, serrate divisions. 18-24 i. Ex.

sibiri'ca, (b. Ju. ♃.) beardless; stem hollow, terete, higher than the leaves, somewhat 3-flowered; leaves linear; capsules short, 3-angled, obtuse at each end. *S.*

ISAN''THUS. 13—1. (*Labiatæ.*) [From *isos*, equal, *anthos*, flower.]

cæru'leus, (blue gentian, false pennyroyal, b. Ju. ☉.) viscid, hairy; leaves lance-oval, acute at both ends, 3-nerved; peduncles 1-2 flowered.

ISA'TIS. 14—1. (*Cruciferæ.*) [Name given by Dioscorides, origin unknown.]

tincto'ria, (woad, J. ♂.) radical leaves crenate, cauline ones sagittate, oblong.

ISNAR''DIA. (See LUDWIGIA.)

ISOME'RIS. 6—1. (*Cappar''ides.*) [From *isos*, equal, and *meris*, divisions.]

arbo'rea, (y, ♄.) leaves crowded, trifoliate leafets lanceolate, somewhat mucronate glabrous; calyx campanulate; segments triangular-ovate, acuminate.

I'TEA. 5—1. (*Saxifragæ.*)

virgin''ica, (w. J. ♄.) leaves alternate, lanceolate, acuminate, serrulate, pubescent beneath; flowers in terminal racemes. 4-8 f.

I'VA. 17—4. (*Corymbiferæ.*)

frutes''cens, shrubby; leaves opposite, lanceolate, deeply serrate; heads globular, depressed. Seacoast. 3-8 f. High-water shrub. Flowers green.

imbrica'ta, (Au. ♄.) perennial, glabrous, leaves linear-lanceolate, cuneate, succulent, the upper alternate and very entire; involucrum imbricate; chaff of the receptacle spatulate. *S.*

xanthifo'lia, (Au. ☉.) leaves opposite, petioled, heart-ovate, acuminate, doubly-serrate, soft-villous, hoary beneath; spikes naked, panicled. 5-6 f. *S.*

cilia'ta, (Ju. ☉.) herbaceous; leaves lance ovate, sub-serrate; spike somewhat crowded; bracts lanceolate, acuminate, bracts and petioles long-ciliate. 2 f. *S.*

IX''IA. 3—1. (*Irideæ.*) [From *iksos*, glue from the gummy juice of some plants which first bore the name.]

chinen''sis, (blackberry lily, y. r. J. ♃.) corolla about 6-petalled; stem flexuous; leaves ensiform. Ex.

cælesti'na, (b. M. ♃.) leaves linear-subulate, much shorter than the 1-flowered scape. *S.*

JASMI'NUM. 2—1. (*Jasminæ.*) [From *ion*, a violet, and *asme*, odor.]

fru'ticans, (jasmine, y. ♄.) leaves alternate, ternate, simple; leafets obovate, wedge-form, obtuse; branches angled. Ex.

officina'le, (jasmine, w. ♄.) leaves pinnate, opposite; leafets acuminate. Ex.

JATRO'PHA. 19—15. (*Euphorbiæ.*) [From *Jatros*, an ancient physician.]

stimulo'sa, (w. Ju. ♃.) hispid, with prickles; leaves palmate-lobed; lobes toothed; cymes short-peduncled. 6-8 i. *S.*

elas''tica, the juice affords the elastic gum called caoutchouc, or Indian-rubber.

mani'hot affords the cassada root. *S.*

JEFFERSO'NIA. 8—1. (*Papaveraceæ.*) [In honor of Thomas Jefferson, named by Barton.]

diphyl''la, (twin-leaf, w. M. ♃.) stemless; peduncles naked, 1-flowered; leaves in pairs.

JU'GLANS. 19—12. (*Terebintaceæ.*)

cine'rea, (butternut, M. ♄.) leafets numerous, lanceolate, serrate, rounded at the base, soft-pubescent beneath; petioles villose; fruit oblong-ovate, viscid, long-peduncled.

ni'gra, (black walnut, M. ♄.) leafets numerous, lance-ovate, serrate, sub-cordate, narrowed above; petioles and under side of the leaves sub-pubescent; fruit globose with scabrous punctures; nut wrinkled.

re'gia, (madeira nut, M. ♄.) leafets about 9, oval, glabrous, sub-serrate, numerous, sub-equal, fruit globose. Ex. Var. *fraxinifo'lia*, has 9 or 10 leafets, oblong, serrate, smooth, lateral lower one adnate on the common petiole.

JUN"CUS. 6—1. (*Junci.*)

effu'sus, (♃.) scape minute-striate (soft); panicle loose, very branching, spreading; leafets of the calyx lanceolate, acuminate, rather longer than the obovate, obtuse capsule. 2-3 f.

ten"uis, (Ju. ♃.) stem erect, filiform, somewhat dichotomous at the summit, nearly terete, leaves setaceous, channeled; flowers solitary, approximate, sub-sessile; calyx longer than the obtuse capsule. 1 f.

nodo'sus, (Ju. ♃.) stem somewhat leafy; leaves nodose-articulate; heads about 2, globose; one of them lateral and peduncled, the other sessile; sepals mucronate, shorter than the acuminate capsule; leaves few, and very slender. 8-10 i.

bufo'nius, (toad-rush, Ju. ☉.) stem dichotomous above, panicled; leaves filiform, setaceous, channeled; flowers sub-solitary, sessile, 1-sided; sepals very acuminate, much longer than the oval-ovate capsule. 3-6 i.

acumina'tus, (Au. ♃.) stem leafy, erect; leaves terete, nodose-articulate; panicle terminal, compound; heads 3-6 flowered, peduncled, and sessile; sepals lance-linear, somewhat awned, shorter than the acute capsule. 18 i.

polyceph"alus, (Au. ♃.) stem leafy, erect; leaves compressed, nodose, articulate; panicle decompound; heads globose, many-flowered; flowers triandrous; sepals somewhat awned, rather shorter than the triangular, acute capsule. 18-24 i.

re'pens, (J. ♃.) creeping; stem geniculate, branching; leaves linear, flat; fascicles lateral and terminal; flowers triandrous; leaves of the calyx subulate, carinate, very acute. 6-10 i. *S.*

biflo'rus, (Ju. ♃.) stem terete; leaves linear, flat; panicle decompound, long; fascicles 2-flowered. 3 f. *S.*

JUNGERMAN"NIA. 21—3. (*Hepaticæ.*) [From John Gotlob Juncker, a learned German of the last century.]

complana'ta, stem branched, creeping; leaves roundish, very entire; ears sub-ovate, flattish. On smooth bark; very rarely on rocks.

palma'ta, frond short, somewhat ascending, digitate-palmate, nerveless. Dark green. Rotten-wood in wet places. Most of the jungermannia are in fruit late in the spring; some, however, in the winter.

JUNIPE'RUS. 20—15. (*Coniferæ.*) [From *juvenis*, young, *pario*, to bring forth, because it produces its young berries while the old are ripening.]

commu'nis (juniper-tree,) leaves in threes, spreading, mucronate, longer than the berry.

virginia'na, (red cedar,) leaves adnate at the base, in threes. Small tree. Berries covered with a blue powder.

sabi'na, (savin,) leaves opposite, obtuse, glandular in the middle. Small shrub.

JUSSI'ÆU 10—1. (*Onagræ.*) [In honor of the elder Jussieu.]

grandiflo'ra, (y. Ju. ♃.) creeping, stem erect and ascending; leaves lanceolate, entire; peduncles and calyx villose.

erec"ta, (y. Au. ♃.) erect, glabrous; leaves lanceolate; flowers octandrous, sessile. *S.*

subacau'lis, (y. J. ♃.) creeping, glabrous, leaves lance-linear, repand-toothed; flowers solitary, octandrous, peduncled; alternate filaments shortest; petals obovate. *S.*

leptocar"pa, (y. ☉.) erect; stem and calyx somewhat hirsute; leaves lanceolate, attenuate at each end; flowers sessile; capsule slender, cylindric. *S.*

JUSTI'CIA. 2—1. (*Acanthi.*) [In honor of Justice, author of the "British Gardener's Director."]

pedunculo'sa, spikes axillary; flowers crowded, leaves lanceolate; peduncles elongated, alternate. Water willow.

adhato'da, (malabar nut, p. ♄.) leaves lance-ovate; helmet of the corolla concave. Ex.

hu'milis, (W. Ju. ♃.) spikes axillary and terminal, few-flowered; flowers distant, bracts linear; leaves oblong-lanceolate. *S.*

brachia'ta, (r. Ju. ♃.) peduncles axillary, in whorled racemes; pedicels in pairs; bracts obovate, 3-flowered; leaves ovate, acute; petioles very long; stem six-angled, very branching. *S.*

KAL"MIA. 10—1. (*Rhododendra.*) [In honor of its discoverer, Kalm.]

latifo'lia, (laurel, w. and r. Ju. ♄.) leaves long-petioled, scattered, and in threes, oval, smooth both sides; corymbs terminal, with viscid hairs. 3-20 f.

angustifo'lia, (sheep-laurel, J. ♄.) leaves in threes, petioled, oblong, obtuse, sometimes rusty beneath; corymbs lateral, bracts linear; peduncles and calyx with glandular hairs. Var. *ova'ta*, taller; leaves broader, sub-ovate. 2-3 f.

glau'ca, (swamp-laurel,) branches ancipital; leaves glaucous beneath.

cunea'ta, (w. r. ♄.) leaves scattered, sessile, wedge-shaped, oblong, pubescent underneath, at the summit slightly awned; corymbs lateral, few-flowered. *S.*

hirsu'ta, (r. ♄.) branches, leaves, and calyx hairy; leaves opposite and alternate, nearly sessile, lanceolate; peduncles axillary, solitary, 1-flowered, longer than the leaves. *S.*

KO'CHIA. 5—2. (*Atriplices.*)

denta'ta, (J. ☉.) leaves lanceolate, sinuate, toothed; stem erect, very branching. Resembling Chenopodium.

KOELE'RIA. 3—2. (*Gramineæ.*) [In honor of M. Kohler, a German botanist.]

pennsylva'nica, (♃.) panicle long, very slender, rather loose; spikelets shining, the terminal ones 3-flowered. 2 f.

trunca'ta, (J. ♃.) leaves flat, smooth; panicle oblong, racemose; glumes 2-flowered, with a third abortive floret, unequal; lower glume a little scabrous, obtuse, paleas smooth. 2-3 f.

panicula'ta, panicle oblong, smooth, spikelets 2-3 flowered, shining; glumes awnless, very unequal, largest one obtusely truncate. *S.*

crista'ta, (Ju. ♃.) spike somewhat lax; spikelets diverging, 3-4 flowered, somewhat awned and wrinkled, sub-ciliate on the keel. *S.*

KRAME'RIA. 4—1. (*Leguminosæ.*) [In honor of two German botanists, Kramer, father and son.]

lanceola'ta, (y. ♄.) hoary-pubescent; leaves lanceolate, acute, villose; pedicels axillary, about twice as long as the leaves.

KRI'GIA. 17—1. (*Cichoraceæ.*)

virgini'ca, flowers small, orange-yellow; primary leaves roundish, entire, the rest lyrate, nearly smooth; scape 1-flowered. Dwarf dandelion.

amplexicau'lis, (y. Ju. ♃.) glaucous; leaves of the root spatulate, lanceolate, and oval, toothed; scapes somewhat leafy and branched.

carolin″ia'na, leaves runcinate, nearly glabrous; scapes very long, and with the base of the involucrum glandularly hairy. 6-12 i. *S.*

dandeli'on, (y. ♃.) glabrous, slightly glaucous; leaves linear lanceolate, entire, smooth; scape 1-flowered. 8-18 i. *S.*

lyra'ta, (y. ♃.) very glabrous, stemless; leaves sub-lyrate, oblong, acute; scape 1-flowered, naked; divisions of the involucre linear-acute. Arkansas.

KUH'NIA. 17—1. (*Corymbiferæ.*) [Adam Kuhn.]

eupatorioi'des, (W. Au. ♃.) smooth; leaves petioled, broad-lanceolate, serrate; corymbs terminal, few-flowered, crowded. 2-3 f. Shady woods. False boneset.

crito'nia, pubescent; leaves narrower, punctate and glandular beneath; flowers pale yellow. Mountains.

glutino'sa, (w. S.) pubescent, glutinous; leaves lanceolate, tapering toward the summit, notched and toothed, crowded; flowers corymb-panicled. 2 f.

KYLLIN″GA. 3—1. (*Cyperoideæ.*) [From Kylling, a Danish botanist.]

monoceph″ala, (false bog-rush, Oc. ♃.) stem filiform, 3-angled; head globose, sessile; involucrum 3-leaved, very long. 3-12 i.

pu'mila, (dwarf kyllinga, J. ♃.) head globose, sessile, solitary; involucre short, culm setaceous; flowers diandrous. 3-6 i. *S.*

mac″ulata, (three-headed kyllinga, Ju. ♃.) glumes 3, unequal, imbricate; heads generally 3, ovate, sub-acute, sessile. 3-5 f. *S.*

LACTU'CA. 17—1. (*Cichoraceæ.*) [From *lac,* milk, on account of the juice from the stalk.]

elonga'ta, (wild lettuce, y. Ju. ♂. or ♄.) leaves smooth, lower ones runcinate, amplexicaul, upper ones lanceolate, sessile; flowers panicled. 4-6 f.

sati'va, (lettuce, y. Ju. ⊙.) leaves roundish, cauline ones cordate; stem corymbed. Var. *roma'na,* has oblong, straight leaves, narrowed at the base. Var. *cris″pa,* has sinuate-crenate leaves, toothed, undulated, crisped, radical ones hairy on the keel. Var. *lacinia'ta,* has the lower leaves pinnatifid, and the upper ones runcinate. Ex.

hirsu'ta, (y. p. ♃.) lower part of the stem and leaves hairy; radical leaves lyrate segments truncate, sub-dentate, upper ones partly runcinate, pinnatifid; flowers in racemes

integrifo'lia, (y. Ju. ♂.) leaves sagittate, entire, unarmed, and clasping; flowers panicled. 3-4 f.

sanguin″ea, (wood-lettuce, r. Au. ♂.) leaves amplexicaul, runcinate, glaucous beneath, with the midrib filamentous; flowers panicled. 2-3 f.

graminifo'lia, (p. Ju.) leaves unarmed, generally undivided, simple at the base, long-linear; panicle leafless, loose, branched, few-flowered; stem erect, simple, flowers all peduncled. 3 f. *S.*

sagittifo'lia, (y. r. Au.) stem erect, glabrous; leaves lance-oblong, acute, entire, glabrous, pale beneath, close-sessile, sagittate at the base; flowers panicled. *S.*

LA'MIUM. 13—1. (*Laviatæ.*) [From *Lamium,* a mountain of Ionia, where it grew.]

amplexicau'le, (dead-nettle, r. Nov. ⊙.) floral leaves broadly cordate, sessile, amplexicaul, crenate, radical leaves petioled. 6-10 i.

purpu'reum, (p. ⊙.) leaves cordate, crenate-serrate, petiolate, upper ones crowded; stem nakedish downwards. 4-8 i.

garga'nicum, (dead-nettle, ♃.) leaves cordate, concave; throat of the corolla inflated; tube short. Ex.

hispidu'lum, (w.) leaves long-petioled, broad-cordate, pubescent; axils 1-flowered; stem hispid. *S.*

LANTA'NA. 13—2. (*Pediculares.*)

cama'ra, (y. Au. ♄.) leaves opposite, lance-ovate, crenate and serrate, scabrous, stem rough, not prickly; flowers in umbellate heads, leafless. 2-4 f. *S.* Hot-house plants, nearly allied to the verbenas.

LATHY'RUS. 16—10. (*Leguminosæ.*) [From *lathuros,* leguminous.]

odora'tus, (sweet pea, J. ⊙.) peduncles 2-flowered; tendril with ovate-oblong leafets; legumes hirsute. Ex.

latifo'lius, (everlasting-pea, Au. ♃) peduncles many-flowered; tendril with 2 lance-ovate leaves; membranaceous between joints. Ex.

palus″tris, (w-p. Ju. ♃.) stem smooth, winged, weak; leafets in 3 pairs, oblong, mucronate; stipules acute, semi-sagittate, peduncles 3-5-flowered, a little longer than the leaves; legume compressed. Low grounds.

myrtifo'lius, flowers smaller than the preceding, purple and rose-colored; leafets 4, reticulate, scabrous on the margin; peduncles longer than the leaves, 3-4-flowered. Salt marshes.

veno'sus, numerous leafets, veiny; peduncles shorter than the leaves, 4-5-flowered.

mariti'mus, (beach pea, p. Ju. ♃.) stem compressed, 4-angled; stipules sagittate leafets numerous, sub-alternate, obovate peduncles shorter than the leaves, about 7 flowered.

sati'vus, (chick vetch, ⊙.) peduncles 1 flowered, tendrils with 2 and 4 leafets; legumes ovate, compressed, with two narrow wings on the back. Ex.

grandiflo'rus, (♃.) remarkable for the large size of its flowers. Ex.

tingita'nus, (tangier pea,) a tall plant, the flowers of which are dark purple. Ex.

magellan''icus, (♃.) the foliage very beautiful with blue flowers. Ex.

pusil''lus, (p. M.) cirrhi 2-leaved, simple; leaves linear lanceolate, peduncles 1-flowered, long; stipules falcate; stem angled and winged. *S.*

decaphyl''lus, (p. ♃.) leaves in 5 pairs; leafets oval-oblong, mucronate; peduncles 3-4-flowered; stem 4-angled. *S.*

LAU'RUS. 9—1. (*Lauri.*) [From *laus*, praise, because it was used to crown the heads of distinguished persons.]

ben''zoin, (spice bush, fever bush, g. y. Ap. ♄.) leaves wedge-obovate, whitish, subpubescent beneath; flowers in clustered umbels; buds and pedicels glabrous. 4-10 f.

sas''safras, (sassafras-tree, y. M. ♄.) leaves entire and lobed on the same plant; flowers mostly diœcious. 10-25 f.

carolin''ensis, leaves perennial, oval, lanceolate, coriaceous, glaucous beneath; peduncles simple, terminated with a few-flowered fascicle; outer segments of the calyx half as long as the inner. A large shrub. Flowers polygamous, in small clusters, pale yellow; drupe dark blue. From Georgia to Delaware.

perse'a, alligator pear of the West Indies, an eatable fruit.

cinnamo'num, the inner bark affords the cinnamon of commerce. Indies.

no'bilis, leaves veined, lanceolate and perennial; flowers 4-cleft. This is the poet's laurel, the fabled favorite of Apollo. It is a handsome evergreen shrub; berries and leaves fragrant. Native of Italy.

camphora'tus, (camphor-tree, ♄.) leaves about 3-nerved, lance-ovate; panicle spreading. From Japan.

æstiva'lis, leaves veined, oblong, acuminate, rugose underneath; branches axillary above. *S.*

catesbya'na, (w. M. ♄.) panicles on short peduncles; segments of the corolla oblong, obtuse, nearly equal, deciduous; leaves perennial, broad-lanceolate. 6-9 f. *S.*

genicula'ta, (y. Ap. ♄.) stem dichotomous, flexuous; flowers in umbels; leaves small, oval, smooth. 10-15 f. *S.*

melissæfo'lia, (y. Ap. ♃.) root creeping; leaves cordate-lanceolate, strongly veined, pubescent beneath; flowers in clustered umbels; buds and pedicels villose. 2-3 f. *S.*

LAVANDU'LA. 13—1. (*Labiatæ.*) [From *lavo*, to wash, so called, because, on account of its perfume, it was used in baths.]

spica'ta, (lavender, Au. ♃.) leaves sessile, lance-linear, with revolute margins; spike interruptedly naked. Ex.

LAVATE'RA. 15—12. (*Malvaceæ.*) [In honor of Lavater, a celebrated writer on physiognomy.]

trimen''sis, (red lavatera.) lower leaves angled; upper ones 3-lobed, with the middle lobe longest; peduncles solitary. 2 f. Introduced.

arbo'rea, (tree-mallows, S. ♂.) stem woody; leaves downy, plaited, 7-angled, flowers large, purplish, rose-color, darker on the base, on aggregated, axillary stalks Ex.

thurin''gia'ca, (gay mallows, ♃.) peduncles solitary; lower leaves angled; upper ones 3-lobed, the middle lobe longest.

LECHE'A. 3—3.

ma'jor, (pin-weed; g-p. Ju. ♃.) erect, hirsute; leaves lance-oblong, mucronate; panicle leafy; branches bearing flowers at their tops; flowers in fascicled racemes, one-way, on short pedicels. Dry woods and hills. 1-2 f.

mi'nor, stem assurgent, smoothish, branched; leaves linear-lanceolate, acute; panicle leafy; branches elongated; flowers racemose. 8 i.

thymifo'lia, (Ju. ♃.) whole plant whitish villose; stem erect; pedicels very short; leaves linear, acute; panicle leafy, elongated; branches very short; flowers minute, in lateral and terminal fascicles. 1 f.

LE'DUM. 10—1. (*Ericeæ.*) [From the *ledon* of the ancient Greeks, supposed to have been a species of Cistus.]

latifo'lium, (Labrador tea, w. r. J. ♃.) leaves oblong, replicate at the margin, ferruginous, tomentose beneath; stamens 5, as long as the corolla. Evergreen shrub, irregularly branched, woolly; flowers in long, terminal corymbs.

palus''tre, leaves linear, revolute on the margin; stamens 10, longer than the corolla. A shrub smaller than the preceding with narrower leaves.

buxifo'lia, a small compact-growing plant with box-like leaves; clusters of white flowers, petals tinged with pink.

LEER''SIA. 3—2. (*Gramineæ.*) [In honor of Leers, who wrote on botany in 1775.]

virgin''ica, (white grass, Ju. y. ♃.) panicle simple; the lower branches diffuse, flowers appressed, monandrous, sparingly ciliate on the keel. 2-4 f.

oryzoi'des, (cut grass, Au. ♃.) panicle diffuse, sheathed at the base; flowers triandrous, spreading; keel of the glumes conspicuously ciliate. 3-5 f.

len''ticula'ris, (catch-fly grass, Ju. ♃.) panicle erect; flowers large, nearly orbicular, diandrous, imbricate, keel and nerves ciliate. 2-4 f.

LEIOPHYL''LUM. 10—1. (*Ericeæ.*) [From *leios*, smooth, and *phullon*, leaf.]

buxifo'lium, (sand myrtle, w. ♄.) leave small, lance-oval, entire, glabrous, lucid, revolute at the margin; corymbs terminal 6-18 i.

LEM''NA. 19—2. (*Naides.*) [From *lemo*, deprived of bark.]

trisul''ca, (duck's meat, ☉. f.) fronds thin elliptic-lanceolate, caudate at one extremity, at the other serrate; root a single fibre Young fronds produced from lateral clefts, of the same shape as the parent plant, and again proliferous before they are detached. Flowers very minute. Water.

polyrrhi′za, (water flax-seed, Ju. ☉.) fronds obovate rotundulate, compressed; roots numerous, fascicled. Stagnant waters.

LEON″TICE. 6—1. (*Berberides.*)

thalictroi′des, (poppoose-root, false cohosh, p-y. Ap. ♃.) leaves bi-triternate; leafets 2-3-lobed; flowers paniculate, from the centre of the leaves. 1 f.

LEON″TODON. 17—1. (*Cichoraceæ.*) [From *leon,* a lion, *odons,* tooth, from the shape of its leaves.]

tarax″acum, (dandelion, y. Ap. ♃.) outer calyx reflexed; scape 1-flowered; leaves runcinate, with toothed divisions. Introduced.

palus″tre, (marsh-dandelion, ♃.) leaves sinuate-toothed, somewhat glabrous; outer involucre scales short, erect, ovate.

LEONU′RUS. 13—1. (*Labiatæ.*) [From *leon,* a lion, and *oura,* tail.]

cardia′ca, (motherwort, w-r. Ju. ♃.) leaves 3-lobed, toothed, bases wedge-form; calyx prickly, less than the corolla. Naturalized. 2-4 f.

marrubias″trum, (r. Au.) leaves lanceolate, toothed; calyx somewhat prickly, as long as the corolla. Naturalized. 2-4 f.

LEPID″IUM. 14—1. (*Cruciferæ.*) [From *lepis,* a scale, from its supposed virtue in cleansing the skin.]

virgini′cum, (wild pepper-grass, w. J. ♃.) radical leaves pinnatifid; cauline leaves lance-linear; flowers with 4 petals, stamens 2-4; pouch orbicular, flat, emarginate, shorter than the pedicel. Sandy fields.

campes″tre, (field pepper-grass.) cauline leaves sagittate. Hills.

sati′vum, (pepper-grass, w. Ju. ☉.) leaves oblong, many-cleft.

rudera′le, flowers diandrous, apetalous; radical and cauline leaves pinnatifid or incised; branch leaves linear very entire; silicles broad-oval, emarginate, spreading; cotyledons incumbent.

menzie′sia, flowers diandrous, apetalous; radical leaves bi-pinnatifid; cauline and branch-leaves many, pinnatifid, upper ones linear, very entire. One variety with its radical leaves hispid; another, pubescent.

monta′num, (♃.) nearly glabrous, decumbent; silicles elliptical, slightly emarginate, wingless; style conspicuous; leaves pinnatifid, and bi-pinnatifid; segments oblong; upper leaves trifid or entire. Oregon.

califor′nicum, (☉.) stem somewhat hirsutely pubescent, much branched; silicles nearly orbicular, emarginate, wingless; flowers diandrous (petals 4); leaves nearly glabrous, laciniately pinnatifid. California.

LEPTAN″DRA. 2—1. (*Scrophulariæ.*)

virgin″ica. (w. Ju. Aug. ♃.) leaves verticillate, in fours or fives, lanceolate-serrate, petioled. 3-4 f. Culver'sphysic.

LEP″TOPO′DA. 17—3. (*Corymbiferæ.*)

fimbria′ta, (y. Ap. ♃.) stem viscid pubescent, striate; leaves alternate, lance-linear, half clasping, glabrous, punctate; cauline ones gash-toothed, chaff of the egret torn. 2 f. Florida.

decur″rens, (y. Ap. ♃.) stem very glabrous; leaves linear-lanceolate, toothed glabrous, decurrent; chaff of the pappus fimbriate. 12-18 i. *S.*

LEPU′ROPE′TALON. 5—3. (*Saxifragæ.*)

spat″ula′tum, (w. Ap. ☉.) glabrous; stem erect and procumbent, somewhat succulent sub-angled; leaves alternate, sessile, lance spatulate, obtuse, entire. 1-2 i.

LESPEDE′ZA. 16—10. (*Leguminosæ.*) [In honor of Lespedes.]

polysta′chia, (bush-clover, w. r. Aug. ♃.) stem erect, branched, very villose; leaves on very short petioles; leafets round-oval, obtuse; spikes oblong, axillary, pedunculate, twice as long as the leaves; corolla and legume as long as the calyx; flowers in dense racemes, on peduncles longer than the leaves. 2-4 f.

viola′cea, longer leaves and petioles than the preceding, is more branching, and has violet-colored flowers.

procum″bens, slender and procumbent, pubescent; racemes sub umbellate; flowers in pairs, purple with yellow spots. 2-3 f.

capita′ta, leaves on very short petioles; spikes capitate, on short peduncles, conglobate, terminal; calyx villose, as long as the corolla, legume much longer. Borders of woods. Aug. 2-3 f. Flowers purple.

angus″tifo′lia, (w-p. S. ♃.) leafets linear-lanceolate, hoary, pubescent; racemes capitate, longer than the leaves; corolla longer than the calyx; stem erect. 3-5 f.

stu′vei, (p. S.) stem erect, simple, silky villose; leafets oval; racemes pedunculate scarcely longer than the leaves, loose, lower loments naked, pubescent. 2-3 f.

sessiliflo′ra, (bush-clover, p. Ju. ♃.) stem erect, branching; leafets oblong; clusters of flowers numerous, sessile; pods acute, scarcely covered by the minute calyx. 1-3 f.

diver″gens, (p. Ju. ♃.) diffuse, branched, leafets oblong, obtuse, close-pressed, hairy underneath; racemes not as long as the petioles; flowers in pairs; legumes ovate-reticulate, smooth. Probably a variety of the *viola′cea.* 1-2 f.

re′pens, (p. Ju. ♃.) leaves ternate; leafets roundish elliptical, emarginate; racemes axillary; legume repand.

prostra′ta, (p. Au. ♃.) smooth, prostrate; leaves short petioled; leafets obovate-elliptic, obtuse; racemes axillary and terminal, sub-paniculate; peduncles very long; legumes oval, sub-pubescent.

longifo′lia, (♃.) erect, angled, pubescent; petioles short; leafets oblong, glabrous above, silk-silvery and close-pressed underneath; racemes fascicled-corymbed, many-flowered, axillary and sub-terminal; legume shorter than the acuminate lobes of the calyx. Louisiana.

frutes″cens, (♃.) stem erect; leafets elliptical, obtuse, silky-pubescent; flowers in sub-capitate fascicles, shorter than the leaves, conglomerate towards the summit of the stem; loments hairy, shorter than the villous calyx. 2-3 f. *S.*

LEU′CAS. 13—1. (*Labiatæ.*) [From *leukos*, white.]

martinien″sis, leaves entire; whorls many-flowered, capitate. Native of India.

LEWIS″IA. 12—1. (*Portulaceæ.*) [In honor of Gen. Lewis, the leader of the first expedition to the Rocky Mountains.]

redivi′va, (w. Ju. ♃.) leaves radical, linear, somewhat fleshy, obtusish; scape 1-2-flowered; pedicel geniculate at the base; capsule oblong. *S.*

LIA′TRIS. 17—1. (*Corymbiferæ.*)

spica′ta, (gay feather, Aug. ♃.) leaves linear, entire, smooth, cordate at the base, nerved and punctate; flowers in spikes; scales of the calyx linear-oblong, obtuse. Meadows. Flowers purple. 3-6 f.

pilo′sa, stem simple, pubescent; leaves long, linear, hairy, ciliate; flowers in loose racemes, bright purple, small.

ele′gans, (p. r. Oct. ♃.) stem simple, villose; leaves lance-linear, sub-scabrous beneath; raceme cylindrical; flowers crowded; inner scales of the calyx colored. *S.*

scario′sa, (blue blazing-star,) leaves tapering to both ends; calyx squarrose below, racemed; scales spatulate, with colored membranaceous margins. 3 f.

squarro′sa, (r. S. ♃.) stem simple, pubescent; leaves linear, very long; raceme few-flowered, leafy; calyx large; scales leafy, lanceolate, mucronate, rigid and spreading; segments of the florets linear, villous internally. 2-3 f.

cylin″drica, (p. Au. ♃.) slender, hirsute; leaves grass-like; spike few-flowered; involucre sub-sessile, cylindric, few-flowered; scales round at the summit, abruptly mucronate. 1-2 f.

pycnos″ta′chya, (S. ♃.) stem simple, hairy; leaves straight, narrow-linear, pubescent; spike long; flowers clustered, sessile; involucrum appressed, squarrose at the summit. *S.*

as″pera, (S. ♃.) stem somewhat branching, scabrous-pubescent; leaves linear-lanceolate, very rough; heads short, spiked, distinctly alternate, solitary, sessile; scales of the involucrum roundish, obtuse-connivent. *S.*

graminifo′lia, (p. S. ♃.) stem simple, glabrous; leaves linear, very long, glabrous, nerved, margin somewhat scabrous, midrib hairy above; flowers in spikes, rather distant, nearly sessile; scales of the involucrum oblong, obtuse, mucronate, ciliate, appressed, the interior colored. 2-4 f. *S.*

hetrophyl″la, (S. ♃.) stem simple, glabrous; leaves lanceolate, glabrous, smooth; upper ones lance-linear, much smaller; heads spiked, short peduncled, sub-squarrose; scales of the involucrum lanceolate, acute, naked. *S.*

tenuifo′lia, (p. S.) stem slender, glabrous; lower leaves crowded, linear, a little hairy at base, upper ones setaceous; racemes very long; pedicels leafy; scales of the involucrum oblong mucronate. 2-4 f. *S.*

resino′sa, (p.) glabrous; leaves linear crowded; heads spiked, oblong, 4-5-flowered; scales of the involucrum obtuse, appressed, resinous, finally hoary.

secun″da, (p. S. ♃.) stem reclining, pubescent; leaves linear, glabrous, sparingly fringed at the base; racemes secund; scales of the involucrum lanceolate, acute, appressed. 2-3 f. *S.*

sphæroi′dea, (p. S. ♃.) leaves smooth, lower ones broad, lanceolate, upper ones narrow; flowers racemed, large, solitary, alternate; involucrum nearly globular; the scales oval, erect. 2-4 f. *S.*

Flowers in corymbs; roots fibrous.

pauciflo′ra, (♃.) stem simple, glabrous leaves linear; panicle virgate, leafy, with the branches short; few-flowered; involucrum sessile, secund, 3-5-flowered; scales erect, lanceolate, acute, glabrous.

panicula′ta, (p. S. ♃.) stem simple, hairy-viscid; leaves lanceolate, nerved, nearly glabrous; panicle contracted; involucrum generally 5-flowered; scales lanceolate. 1-2 f.

odoratis″sima, (p. S. ♃.) very glabrous; stem simple; leaves ovate and lanceolate, nerved, toothed, slightly glaucous; panicle corymbose; involucrum 7-8-flowered; scales obovate, obtuse. 3-4 f.

tomento′sa, (p. S. ♃.) stem simple, with the cuneate-lanceolate leaves hairy; corymb few-flowered, depressed-divaricate; involucrum tomentose; scales ovate, acute. 2 f.

wal″teri, (p. S. ♃.) leaves lanceolate, acute, glabrous, dotted, attenuate at base stem simple, hairy near the summit; involucrum many-flowered; scales acute; tomentose. 2 f.

frutico′sa, (p. ♄.) glabrous; stem fruticose; branches corymbed; leaves wedge obovate, punctate; involucrum sub-5-flowered; divisions acuminate. Florida.

squamo′sa, (♃.) pulverulent-canescent, corymbose; little corymbs 3-5-flowered, radical leaves linear, long; cauline ones appressed, very short; involucrum sub-hemispheric; scales acute. *S.*

LIGUS″TICUM. 5—2. (*Umbelliferæ.*) [From *Liguria* in Italy, its native country.]

sco′ticum, (Scottish loveage, w. Ju. ♃.) lower leaves bi-ternate, upper ones ternate; leafets broad, smooth, serrate, entire at the base, dark green; flowers white with a reddish tinge; stem erect, smooth, striate, 12 inches high; umbels many-rayed; petals inflexed. The root is acrid, and is used by the people of the Hebrides as a substitute for tobacco. Very abundant on the sea coast in Scotland; found in salt marshes in this country.

levisti′cum, (smellage,) leaves many, upper ones toothed. Medicinal. Ex.

LIGUS″TRUM. 2—1. (*Jasmineæ.*)

vulga′re, (prim, w. J. ♄.) leaves lanceolate, acutish; panicle compact introduced. Sometimes called privet; very common in England.

lu'cidum, and *spica'tum*, sub-evergreen shrubs or low trees, natives of China.

LIL"IUM. 6—1. (*Liliaceæ.*) [From *leios*, graceful, on account of its beauty.]

philadel"phicum, (red lily, r. y. J. ♃.) leaves whorled, lance-linear, 3-nerved, nerves hairy beneath; corolla erect, bell-form, spreading; petals lanceolate, having claws.

canaden"se, (nodding lily, y. r. Ju. ♃.) leaves remotely whorled, lanceolate; peduncles terminal, elongated, mostly in threes; corolla nodding; petals spreading. 2-3 f.

super"bum, (superb lily, y. p. Ju. ♃.) leaves lance-linear, 3-nerved, glabrous; lower ones whorled; upper ones scattered; flowers in a pyramid raceme; petals revolute. 3-6 f. Wet meadows.

cates"bæi, (Southern lily,) leaves scattered, lance-linear, very acute; stem 1-flowered; corolla erect; segments with long claws, undulate on the margin, reflexed at the summit; flowers scarlet, spotted with yellow and brown. Stem 18 i.

pennsylva'nicum, leaves scattered, lance-linear, the upper ones whorled; stem about 1-flowered; peduncles woolly; corolla erect, woolly without; flowers red and yellow.

mar"tagon, (Turk's cap,) leaves narrow, peduncles terminal; petals reflexed so as to give the corolla the appearance of a turban; flowers scarlet, with varieties; stem 2-3 feet high. Ex.

tigri'num, (tiger lily,) leaves scattered; petals reflexed; flowers in whorls; dark orange, spotted with black; stem bulbiferous. A very showy plant, of easy culture. 4-5 f. Ex.

japon"icum, (Japan lily,) corolla elongated into a tube; flowers very large, pure white, with a streak of blue; stem 4-5 feet high, generally with 2 flowers. Ex.

pu'dicum, stem 1-flowered; corolla bell-form, nodding; petals erect, sessile, spatulate-obovate, flat within; yellow. *S.*

umbella'tum, flowers 1 to 5, terminal, erect; petals unguiculate, spreading, red. *S.*

can"didum, (white lily, w. J. ♃.) leaves lanceolate, scattered, tapering to the base; corolla bell-form, glabrous within. Ex.

bulbif"erum, (orange lily, y. J. ♃.) leaves scattered, 3-nerved; corolla campanulate, erect, scabrous within. Ex.

carolinia'num, (Au. ♃.) leaves verticillate and scattered, lanceolate, cuneate at base; flowers few (1-3,) terminal; peduncles thick; corolla revolute orange-colored, spotted with dark purple. Perhaps a variety of the superbum. 2 f. *S.*

pompo'nium, (J.) a splendid species with scarlet flowers.

LIMNAN"THES. 10—1. (*Geraniæ.*) [From *limnus*, a water nymph, *anthos*, flower.]

douglass"ii, (y. w.) leaves bipinnatifid; the divisions often alternate. Plant slightly succulent. California.

LIMNET"IS. 3—1. (*Gramineæ.*) [From *limnes*, a pool or marsh, alluding to its place of growth.]

cynosuroi'des, (many-spiked salt-grass, Au. ♃.) spikes numerous (10-40) peduncled, panicled, spreading; leaves broad, flat, at length convolute; a short awn on one of the glumes; styles 2-cleft at the summit. 4-9 f.

junce'a, (rush salt-grass, Ju. ♃.) leaves 2-ranked, convolute, spreading; spikes few, (1-3) peduncled; peduncles smooth; paleas obtusish; styles 2. 18 i.

gla'bra, (Au. ♃.) leaves concave. erect; spikes alternate, sessile, erect, appressed paleas smoothish on the keel; style deep cleft. 3-5 f.

LIMO'NIA. 10—1. (*Aurantia.*)

acidis"sima, leaves pinnate; leafets roundish-oval, crenate; spines germinate. Florida.

LIMOSEL"LA. 13—2. (*Scrophulariæ.*) [From *limus*, slime or mud.]

subula'ta, (mudwort, Aug. ♃.) leaves linear, very narrow, scarcely dilated at the apex; scape 1-flowered, as long as the leaves. Muddy shores. Stem an inch high; flowers very small, bluish white.

LINDER"NIA. 2—1. (*Scrophulariæ.*) [In honor of Von Lindern.]

attenu'ata, (false hedge hyssop, w-p. Ju. ☉.) leaves lanceolate and obovate, narrowed at the base; peduncle shorter than the leaves, erect.

dilata'ta, leaves dilated at the base, clasping; peduncles longer than the leaves; flowers pale purple. Inundated banks Stem 4-sided, 6 inches high, smooth.

montico'la, (June. ♃.) stem slender, dichotomous; radical leaves spatulate, punctate; cauline ones linear, small, remote; peduncles very long; flowers pale blue stem erect. 4-6 inches high.

grandiflo'ra, (♃.) leaves roundish, entire, nerveless, half-clasping; peduncles very long, axillary and terminal; stem creeping. *S.*

refrac"ta, (b. J. ♃.) radical leaves spatulate-oval; upper ones subulate; flowers solitary, axillary and terminal; peduncles refracted, after flowering; stem slender erect, branching, glabrous. 8-12 i. *S.*

LINNÆ'A. 4—1. (*Caprifoliæ.*) [In honor of Charles Von Linnæus.]

borea'lis, (twin-flower, w. r. J. ♃.) stem prostrate; branches erect, each bearing 2 flowers; leaves roundish, crenate. Woods and hills. Evergreen, creeping. Has been found at Green Island, Troy, N. Y.

LI'NUM. 5—5. (*Caryophylleæ.*) [From *leios*, smooth or soft, on account of its texture.]

usitatis"simum, (common flax, b. Ju. ☉.) leafets of the calyx ovate, acute, 3-nerved petals crenate; leaves lanceolate, alternate, stem sub-solitary. Ex.

virgin"icum, (Virginia flax. y. ☉.) stem erect, slender, smooth; radical leaves oval and spatulate; cauline leaves long and narrow; panicle lax, corymbose.

ri'gidum, (y.) divisions of the calyx ovate acuminate, 3-nerved, ciliate; petals oblong narrow; leaves stiffly erect, linear, short 6 i. Missouri.

selaginoi'des, (w-r.) glabrous; stems a span high, suffruticose, corymbosely attached at the summit; leaves crowded alternate, very small linear and very narrow, mucronate, proliferous; flowers terminal, sub-sessile, petals shorter than the calyx; ovary 10-celled. Texas.

LIPA′RIS. 18—1. (*Orchideæ.*) [From *lipos*, fat, so called on account of its unctuous property.]

liliifo′lia, (y-w. Ju. ♃.) leaves 2, ovate-oblong; scape angular; flowers racemose; segments of the perianth linear; lower ones setaceous, reflexed; lip concave, obovate, mucronate. 6-8 i. Wet woods.

LIQUIDAM″BER. 19—12. (*Amentaceæ.*) [From *liquidum*, fluid, and *amber*, fragrant, alluding to the gum which distils from this tree.]

styraciflu′a, (sweet gum-tree, M. ♄.) leaves palmately-lobed; lobes acuminate, serrate, with sinuses at the base of veins, villose. A resinous juice called liquid *amber*, is obtained by wounding the bark of this tree. By boiling the leaves, a different gummy substance, called liquid *storax*, is obtained.

LIRIODEN″DRON. 12—13. (*Magnoliæ.*) [From *leiron*, a lily, and *dendron*, a tree.]

tulipif″era, (white wood, tulip-tree, y-r. J ♄.) leaves truncate at the end, with 2 side-lobes. A beautiful flowering tree. 90-150 f.

LISIAN″THUS. 5—1. (*Gentianæ.*)

glaucifo′lius, (y.) stem herbaceous, terete; leaves oblong-ovate, sessile, glaucous, acute, 3-nerved; flowers terminal, corymbed; peduncles elongated.

russelia′nus, a ligneous plant with handsome purple flowers. Ex.

LISTE′RA. 18—1. (*Orchideæ.*) [Named from Martin Lister, physician to Queen Anne.]

corda′ta, stem with 2 opposite, roundish, cordate leaves; raceme loose; column without any appendage behind; lip elongate, 2-toothed at the base, deeply bifid, the segments divaricate and acute. Swamps. Stem 4-6 i. Flowers distant and minute.

convallarioi′des, (lily orchis.) column porrected; lip oblong, dilated, and obtusely 2-lobed at the extremity; stem 6 inches, very slender; root fibrous; flowers dark brown and green, larger than the preceding.

pubes″cens, (g-w. J. ♃.) leaves radical, ovate, acute; scape leafless, pubescent, loosely flowered; flowers on pedicels, lip 2-lobed, scarcely longer than the connivent petals; capsules clavate; root palmate. *S.*

LITHOSPER″MUM. 5—1. (*Boragineæ.*) [From *lithos*, a stone, and *sperma*, seed, on account of the hardness of its seed.]

arven″se, (corn gromwell, w. M. ☉.) stem erect, branched; leaves sessile, lance-linear, rather acute, veinless, rough, hairy; calyx a little shorter than the corolla; segments spreading; nuts rugose; plant hispid, pilose; flowers solitary, axillary. Fields. Introduced.

officina′le, (common gromwell, y. M. ♃.) stem covered with rigid hairs; leaves broad-lanceolate, acute, rough on the upper surface, hairy on the lower; tube of the corolla as long as the calyx; nuts smooth. Fields Flowers axillary, pale yellow.

mariti′mum, has blue flowers.

denticula′tum, has purple flowers.

pilo′sum, (y. ♃.) simple, pilose-hirsute; leaves linear, acuminate, sessile, approximate; flowers fascicled, sessile, smallish divisions of the corolla oblong, entire.

torrey′i, (J. ♃.) strigose-hispid; leaves oblong-linear, obtusish, scattered; stem low, branching; fascicles terminal, few-flowered; lobes of the corolla oblong, entire. 9 i.

angustifo′lium, (w. Ju. ☉.) nut turgidly ovate, shining, with hollow punctures on every part; flowers mostly lateral; leaves linear, with close-pressed pubescence; stem procumbent. *S.*

apu′lum, (y. Ju. ☉.) nut muricate; spikes terminal, 1-sided; bracts lanceolate; leaves lance-linear, acute. *S.*

LOBE′LIA. 5—1. (*Campanulaceæ.*) [In honor of Mathias Lobelius.]

cardina′lis, (cardinal flower, r. Ju. ♃.) erect, simple, pubescent; leaves lance-ovate, acuminate, denticulate; racemes somewhat 1-sided, many-flowered; stamens longer than the corollas. Damp. 1-2 f.

infla′ta, (Indian tobacco, b. Ju. ☉.) erect, branching, very hirsute; leaves ovate, serrate; racemes leafy; capsules inflated. 12-18 i.

kal″mii, (b. Ju. ☉.) slender, erect, sub-simple; radical leaves spatulate; cauline ones linear, delicately toothed; flowers racemed, alternate, remote, pedicelled. 6-24 i.

dortman″na, (b. Ju. ♃.) leaves linear, 2-celled, fleshy, obtuse; scape nearly naked; flowers in a terminal raceme, remote, pedicelled, nodding; leaves growing in a tuft about the root, spreading, recurved. Water gladiole.

syphilit″ica, flowers on short pedicels, in a long, leafy raceme, large, blue. Bogs. 2-3 f.

claytonia′na, stem erect, simple, pubescent; cauline leaves oblong, obtuse, nearly entire; radical leaves spatulate; racem virgate, naked; flowers pale blue. 1-2 f.

puberu′la, covered with silky down lower leaves obovate, upper lanceolate; flowers spiked, alternate, sub-sessile, bright blue, smaller than the syphilitica.

ful″gens, (native of Mexico,) leaves very long, alternate, sub-entire; raceme many-flowered; stamens and pistils as long as the corolla.

aph″ylla, (♃.) very small; stem filiform, sub-simple, scaly; peduncles remote, elongated. 4-6 i. Florida.

amœ′na, (b. Ju. ♃.) stem erect, pubescent; leaves broad-lanceolate, doubly toothed; spike secund; margin of the calyx erect. 2-4 f. *S.*

glandulo′sa, (b. S. ♃.) erect; leaves linear-lanceolate, rather thick, denticulate; flowers in racemes. *S.*

michauxii, (p. Ju. ☉.) glabrous, branching above; leaves petioled, ovate, crenate-dentate; lowest ones roundish; racemes lax; peduncles elongated. *S.*

LO′LIUM. 3—2. (*Gramineæ.*)

peren″ne, (M. ♃.) florets much longer

than the calyx, unarmed, linear-oblong, compressed. Introduced. 18 i.

temulen″tum, (Ju. ☉.) florets shorter than the glumes, as long as the bristle at their extremity; culm scabrous above. 2 f.

LONICE′RA. 5—1. (*Caprifoliæ.*) [From Lonicer, a botanist of the 16th century.]

semper″virens, (r. y. M. ♄.) spikes with distant, nakedish whorls; corollas sub-equal; tube ventricose above; leaves ovate and obovate, glaucous beneath; upper ones connate-perfoliate; leaves perennial.

caprifo′lium, (honeysuckle, ♄.) corollas ringent-like, terminal; flowers crimson; sessile leaves connate-perfoliate at the top. Ex.

parviflo′ra, (r-y. J. ♄.) spikes verticillate, capitate; leaves deciduous, glaucous beneath, all connate-perfoliate; corolla ringent, gibbous at the base; filaments bearded.

periclyme′num, (woodbine, J. ♄.) flowers in ovate, imbricate, terminal heads; leaves all distinct. Var. *quercifo′lia*, leaves sinuate. Ex.

fla′va, (yellow honeysuckle, J. ♄.) spikes whorled, terminal; corolla ringent; flowers bright yellow.

hirsu′ta, (rough woodbine,) leaves pubescent and ciliate; flowers yellow pubescent; berries orange.

gra′ta, has scarlet flowers. Mountains.

cilio′sum, (J. ♄.) spikes with whorled heads, sub-sessile; corolla sub-equal; tube hirsute, ventricose in the middle; leaves somewhat clasping, sessile, and petioled, ovate, glaucous beneath, margin ciliate, upper ones connate-perfoliate; flowers yellow. *S.*

LOPHIO′LA. 6—1. (*Junci.*)

aure′a, (y. Ju. ♃.) leaves radical, ensiform, shorter than the scape; scape erect, with one or two short leaves; flowers in a crowded corymb; root creeping. Sandy swamps.

LUDWIG″IA. 4—1. (*Onagræ.*) [From Professor Ludwig, of Leipsic.]

pilo′sa, (y. Ju. ♃.) stem erect, branched, hairy; leaves alternate, oblong, sessile; peduncles 1-flowered, axillary; capsule globose, quadrangular. Swamps.

alternifo′lia, stem nearly smooth; leaves alternate, lanceolate, somewhat scabrous on the margins and under side; segments of the calyx large, colored, persistent; flowers yellow, 4-petalled, on short peduncles.

palus″tris, petals 0; stem prostrate, creeping; leaves opposite, smooth; succulent. Grows in stagnant waters.

uniflo′ra, stem straight, simple; leaves alternate, lanceolate, acute, glabrous; flower terminal; petals longer than the calyx. Perhaps synonymous with *alternifo′lia.*

mol″lis, (Au. ♃.) villose; stem erect, much branched; leaves lanceolate; flowers generally clustered; capsule globose, 2-leaved. *S.*

capita′ta, (y. J. ♃.) erect, virgate; leaves linear-lanceolate, glabrous; flowers mostly in terminal heads; bracts longer than the calyx. *S.*

pedunculo′sa, (y. J. ♃.) stem procumbent radicant; leaves opposite, lanceolate, peduncles longer than the leaves. 3-6 i. *S.*

linea′ris, (y. Au. ♃.) erect, branching angled near the summit; leaves linear glabrous; flowers sessile. 2 f.

decur″rens, (y. Au. ♃.) stem erect; leaves ovate-lanceolate, decurrent; flowers octandrous. 2 f. *S.*

na′tans, (y. Ju.) swimming and creeping; leaves opposite, lance-spatulate; flowers axillary, sessile; petals and calyx equally long. *S.*

LUNA′RIA. 14—1. (*Cruciferæ.*) [From *luna* the moon, moon-form.]

an″nua, (honesty, p. ♂.) leaves obtusely toothed; silicles oval, obtuse at both ends. Naturalized.

redivi′va, (satin-flower, b-p. ♃.) leaves with mucronate teeth; silicles tapering to both ends; flowers odorous. Ex.

LUPINAS″TER. 16—10. (*Leguminosæ.*)

macroceph″alus, (y. and p. M. ♃.) leafets nine, oblanceolate; petioles very long; stipules cuneate, gash-3-toothed; teeth of the calyx filiform, plumose. *S.*

LUPI′NUS. 16—10. (*Leguminosæ.*) [From the Greek *lupe*, grief, on account of its acrid juices.]

peren″nis, (wild lupine, p. M. ♃.) stem and leaves smoothish; leaves digitate, with about 8-10 leafets, which are oblanceolate, obtusish; calyxes alternate, not appendaged; banner emarginate; keel entire. 12-18 i.

hirsu′tus, (garden lupine, p. ☉.) calyxes appendaged, alternate; banner 2-parted; keel 3-toothed. Ex.

al″bus, (white lupine, w. Au. ☉.) calyx not appendaged, alternate; banner entire; keel 3-toothed. Ex.

pilo′sus, (rose lupine, r. w. ☉.) calyx whorled; banner 2-parted; keel entire. Ex.

lu′teus, (yellow lupine, y. ☉.) keel 3-toothed. Ex.

mutab″ilis, herbaceous, very branching; attains the height of four or five feet.

nootkaten″sis, (Ju. ♃.) stem and leaves hirsute; leaves digitate; leafets (7-8) lanceolate, obtuse; calyxes whorled, without appendages; banner emarginate; keel entire.

decum″bens, (p.) suffruticose, sub-decumbent; flowers on pedicels, somewhat whorled, bracted; calyx silky-hirsute; banner and keel entire; leafets lance-oblong, acute and obtuse, silky underneath.

seri′ceus, (r. p. Ju. ♃.) stem and leaves silky-tomentose; leaves digitate; leafets (7-8) lanceolate, acute, silky both sides; calyxes somewhat whorled, without appendages; banner gashed; keel entire.

villo′sus, (hairy lupine, w. r. p. J. ♃.) very villose; leaves simple, oblong; calyxes not appendaged, alternate in a long spike; banner 2-cleft; keel entire long Florida.

diffu′sus, (Ap. ♃.) villose, silky; stems numerous, diffuse, decumbent; leaves simple, oblong, obovate, petioles and stipules short, naked. *S.*

argen″teus, (y-w. Ju. ♃.) leaves digitate; leafets (5-7) lance-linear, acute, glabrous above, silvery-silky underneath; calyxes alternate, not appendaged; banner obtuse; keel entire. *S.*

na′nus, (b. ⊙.) a native of California.

polyphil″lus, (♃.) very vigorous exotics, with spikes of flowers from 1 f. to 18 i. in length.

latifo′lius, (♃.) a native of California. Has very long spikes of blue flowers.

LUZU′LA. 6—1. (*Junceæ.*)

pilo′sa, (M. ♃.) leaves hairy; panicle sub-cymose; peduncles 1-flowered, reflexed; leafets of the perianth acuminate, shorter than the capsule; radical leaves numerous, hirsute. Woods. 6-12 i.

melanocar″pa, culm leafy; leaves sub-lanceolate, smooth; panicles capillary, loose; capsule black. Mountains.

campes″tris, (M. ♃.) leaves hairy; spikes sessile and peduncled glume-like sepals acuminate, longer than the obtuse capsule. 1 f. Mich.

spica′ta, (Au.) leaves narrow, hairy at the throat; spike nodding, compound; glume-like sepals acuminate-awned, about as long as the roundish capsule. 8 i.

LYCH″NIS. 10—5. (*Caryophyllæ.*) [From *luchnos*, a torch.]

chalcedon″ica, (scarlet lichnis, r. J. ♃.) flowers fascicled, level top, or convex. Ex.

floscu′culi, (ragged robin, ♃.) petals torn; capsules 1-celled, roundish. Ex.

apet″ala, (♃.) calyx inflated; corol shorter than the calyx; stem about 1-flowered. Canada.

alpi′na, (r. ♃.) glabrous; flowers in dense umbelled heads; petals 2-cleft; styles 4. Labrador. Canada.

visca′ria, (clammy lichnis, ♃.) stem geniculate, viscous; petals entire; capsule 5-celled. Ex.

LY′CIUM. 4—1. (*Polemoniæ.*) [From the country Lycia.]

carolin″ia′num, (p. Ju. ♄.) unarmed; leaves clustered, cuneate, fleshy; flowers 4-cleft. 3-5 f. *S.*

barba′rum, (matrimony vine, J. r. y. ♄.) stem angled; branches erect; leaves lanceolate, tapering to both ends; calyx mostly 3-cleft. Ex.

LYCOPER″DON. 21—6. (*Fungi.*) [From *lukos*, a wolf, and *perdo*, to explode, so named because it was supposed to be the excrements of this animal.]

bovis″ta, (common puff-ball,) at first white and oboconic, becoming black and spherical; outer coat downy, which peeling off, leaves the leathery inner coat; seeds black, lighter than air, and appearing like smoke. In meadows.

LYCOPO′DIUM. 21—1. (*Filices.*) [From *lukos*, a wolf, and *pous*, foot, so called from its supposed resemblance.]

Spikes pedunculate.

complana′tum, (ground pine, g-y. Ju. ♃.) creeping, erectish; branches alternate, dichotomous; leaves bifareous, connate, spreading at the tips; spikes in pairs, peduncled. Woods.

clava′tum, (club-moss, Ju.) stem creeping; branches ascending; leaves scattered, in curve-bristle-bearing, serrate; spikes in pairs or single, cylindrical, pedunculate scales ovate-acuminate, dentate. Pine woods.

carolin″ia′num, (Ju. ♃.) stem creeping leaves somewhat distichus, spreading, lanceolate, very entire; peduncle erect, solitary, elongated, 1-spiked; bracts sub-lanceolate, entire. Sandy swamps.

2. *Spikes sessile; leaves surrounding the stem.*

dendroi′deum, (tree-weed, g. Ju. ♃.) erect; branches erect; leaves in 6 equal rows; spikes numerous, solitary, sessile Woods. About a span high.

rupes″tre, (festoon-pine, Ju. ♃.) stem creeping; branches sub-divided, ascending; leaves scattered, imbricate, linear-lanceolate, ciliate, ending in hairs; spikes solitary sessile, terminal. Rocks and side hills.

3 *Spikes sessile; leaves distichus.*

albid″ulum, leaves ovate, acute, denticulate, alternate, close-pressed; spikes terminal, long, 4-sided.

apo′dum, (Ju. ♃.) leaves ovate, acute, denticulate, flat, superficial ones alternate, acuminate; spikes terminal, sub-solitary.

4. *Capsules axillary.*

lucid″ulum, (moonfruit pine, M. y. ♃.) leaves in 8 rows, linear-lanceolate, denticulate, acute, spreading, reflexed, shining stem ascending, bifid.

tristach″ymum, (Ju. ♃.) stems erect; branches alternate, dichotomous, sub-compressed; leaves lanceolate, acute, appressed, pointing 4 ways; peduncles solitary, elongated, 3-spiked; spikes terete; scales roundish, acuminate. *S.*

LYCOP″SIS. 5—1. (*Boragineæ.*) [From *lukos*, a wolf, and *opsis*, aspect, because it is a rough-looking plant.]

arven″sis, (b. Ju. ♃.) leaves lanceolate, repand-toothed; racemes in pairs; flowers sessile; whole plant hispid.

virgin″ica, (w. J. ⊙.) small, hispid; under leaves spatulate, upper ones linear-oblong, entire; racemes solitary; flowers on peduncles.

LYCO′PUS. 2—1. (*Labiatæ.*) [From *lukos*, a wolf, and *pous*, foot, sometimes called wolf's-claw.]

europe′us, (water horehound, w. Au. ⊙.) smooth; stem acutely 4-cornered; leaves narrow-lanceolate, with large acute teeth, lower ones somewhat pinnatifid; segments of the calyx acuminate, terminating in short spines. 1-2 f.

virgin″icus, (bugle-weed, w. J. ♃.) leaves broad-lanceolate, serrate, tapering and entire at the base; calyx shorter than the seed, spineless; flowers in whorls. Wet places.

uniflo′rus, (w. J. ♃.) small; root tuberous; stem simple; leaves oval, obtuse, obtusely toothed; axils 1-flowered.

LYGODES″MIA (See PRENAN″THES.

LYGO'DIUM. 21—1. (*Filices.*) [From *lugodes*, pliant, and *ima*, one, or *meivo*, to diminish.]

palma'tum, (climbing fern, g-y. Au. ♃.) stem flexuous and climbing; fronds conjugate, cordate, palmate, 5-lobed; lobes entire, obtuse; spikelets oblong-linear, in a compound terminal spike. 3-4 f.

LYSIMA'CHIA. 5—1. (*Lysimachiæ.*) [From Lysimachus, its discoverer.]

stric"ta, (loose-strife, y. Ju. ♃.) raceme terminal, very long, lax; leaves opposite, lanceolate, sessile; petals lanceolate, spreading. 1-2 f.

cilia'ta, (y. J. ♃.) sub-pubescent; leaves opposite, long-petioled, sub-cordate, oval; petioles ciliate; pedicels somewhat in pairs; flowers nodding. 2-4 f.

quadrifo'lia, (y. J. ♃.) leaves verticillate in fours and fives, ovate-lanceolate, acuminate; peduncles axillary, 1-flowered, by fours; segments of the corolla oval, entire, often obtuse. 12-18 i.

thyrsiflo'ra, (y. J. ♃.) stem simple, smooth; leaves sessile, lanceolate, opposite, acute, paler underneath; racemes lateral, long-peduncled; flowers small. Appearance unlike the rest of the genus. 12-18 i.

hy'brida, stem smooth, somewhat branched; leaves mostly opposite, lanceolate, acute at each end, on short, ciliate petioles; flowers nodding; corolla about as long as the calyx.

revolu'ta, (y. J. ♃.) stem quadrangular, branched; leaves opposite, sessile, long-linear, margin revolute; peduncles 1-flowered, sub-terminal, nodding. 12-18 i.

herbemon"ti, (♃.) flowers in terminal racemes, lower ones verticillate, upper ones scattered; leaves by fours, ovate-lanceolate, sessile, 3-nerved. 2 f. *S.*

lanceola'ta, (♃.) very smooth; leaves by fours, rather petiolate, lanceolate, prominently acuminate; peduncles by fours, many-flowered, upper flowers in racemes; segments of the corolla ovate and acute. *S.*

heterophyl"la, (Ju. ♃.) leaves opposite, lower ones roundish, upper ones linear, sessile; flowers nodding. 12-18 i. *S.*

angustifo'lia, (y. ♃.) very smooth, branching; leaves opposite and whorled, long-linear, punctate; racemes terminal, short; segments of the corolla oblong. *S.*

nummula'ria, (money-wort,) an evergreen trailer in a moist soil, producing shoots two and three feet long. Ex.

verticilla'tum, an upright plant, with a profusion of showy yellow flowers. Ex.

capita'ta, (y. J. ♃.) stem smooth, simple, punctate; leaves opposite, sessile, broad-lanceolate, punctate; peduncles axillary, elongated; flowers in dense heads, 6-7 parted. Swamps. Stem 1 f.

quadriflo'ra, branching; stem smooth; leaves sessile, opposite, long-linear; peduncles in fours, sub-terminal, 1-flowered. 2-3 f.

LYTH"RUM. 11—1. (*Salicariæ.*) [From *luthron*, blood, so called from its color.]

salica'ria, (purple loose-strife, p. Ju. ♃.) pubescent; leaves opposite and ternate, sessile, lanceolate, cordate at the base; flowers with 12 stamens (sometimes 5 or 8) terminal, whorled-spiked; capsule oblong Wet meadows. Stem 2 f.

ala'tum, (p. Ju. ♃.) very glabrous; stem winged; flowers hexandrous, axillary, solitary, sessile. 2-3 f. *S.*

verticilla'tum, (swamp willow-herb, p. Au. ♃.) pubescent; leaves opposite or in threes, lanceolate, petioled; flowers axillary, somewhat in whorls; fruit globose; stamens 10. Wet grounds. 2 f.

hyssopifo'lium, (dwarf grass-poley, w p. ♃.) leaves alternate and opposite, lance-linear, sub-oval; flowers solitary, axillary Hexandrous. 6-10 i.

virga'tum, (p. Ju. ♃.) leaves opposite, lanceolate, glabrous; stem panicled; flowers axillary in threes, on pedicels; stamens 12. *S.*

linea're, (w. Ju. ♃.) smooth, virgate; leaves generally opposite, linear, acute; flowers axillary, solitary, hexandrous. 3-4 f. *S.*

diffu'sum, (p. Au.) 1 foot in height.

MACBRI'DEA. 13—1. (*Labiatæ.*) [In honor of Dr. McBride.]

pul"chra, (p. and w. Au. ♃.) stem erect, simple; leaves opposite, acute, lanceolate, ciliate, serrulate, punctate, glabrous beneath, somewhat hairy above, upper ones sessile, lower ones attenuated at the base as if petioled. 12-18 i. *S.*

MACRO'TRYS. 12—1. (*Ranunculaceæ.*) [From *makros*, large, and *botrus*, a raceme.]

racemo'sa, (bug-bane, blacksnake root cohosh, w. Ju. ♃.) leaves decompound leafets oblong-ovate, gash-toothed; racemes in wand-like spikes; capsules ovate. Woods. 3-9 f.

MAGNO'LIA. 12—12. [From Magnol, who wrote on botany in 1720.]

glau'ca, (sweet-bay, swamp-laurel, w. J. ♄.) leaves glaucous beneath, perennial, obtuse, elliptical; flowers 9-12 petalled; petals obovate, concave. A large shrub, with whitish bark; flowers solitary, odorous. Var. *latifo'lia*, has deciduous leaves. Var *longifo'lia*, has leaves acute at both ends, perennial. N. J. to Car.

acumina'ta, (cucumber-tree, b-y. J. ♄.) leaves deciduous, oval, acuminate, pubescent beneath; flowers 6-9 petalled; petals obovate. Mountains. Penn. to Car. A tree, sometimes 70 feet high.

tripe'tala, (umbrella tree, w. J. ♄.) leaves large, deciduous, cuneate-lanceolate, acute, silky when young; petals 9, oval-lanceolate, acute, the outer ones reflexed. Mountains, woods. Penn. to Geo. A small tree, with very large leaves and flowers.

grandiflo'ra, (big laurel magnolia, w. M ♄.) leaves evergreen, oval, thick, leathery; petals broad, obovate, abruptly narrowed into a claw. 60-80 feet. *S.*

macrophyl"la, (w. J. ♄.) leaves very large, oblong, cuneate-obovate, sinuate and auriculate at base, glaucous beneath; petals 6, ovate-obtuse. 30-35 f. *S* *corda'ta,* (y. M. ♄.) leaves broad, oval or ovate-lanceolate, at base slightly cordate, somewhat tomentose beneath; petals oblong-lanceolate, acute. 40-50 f. *S.*

pyramida'ta, (Ap. ♄.) leaves rhomb-oboval, abruptly acute, both sides colored alike, sub-cordate and auricled at the base; lobes divaricate; petals lanceolate, gradually acute. *S.*

MALAX"IS. 18—1. (*Orchideæ.*) [From *malakia,* softness, from the delicacy of the plants.]

liliifo'lia, (twayblade, w. y. p. J. ♃.) scape 3-cornered; inner petals filiform, reflexed, 2-colored; lip concave, obovate, mucronate; leaves 2, lanceovate, or oval. 4-8 i.

longifo'lia, (y-g. J. ♃.) leaves broad-lanceolate, longer than the scape; spike oblong; lip cordate, concave, channeled, shorter than the petals; bulb roundish; scape 2-leaved. 3-7 i.

MALACHODEN"DRON. 15—5. (*Durantia.*) [From *malake,* soft, *dendron,* tree.]

ova'tum, (w. M. ♄.) leaves ovate, acute; flower solitary, sub-sessile. 6-12 f. *S.*

MAL"OPE. 15—12. (*Malvaceæ.*)

malacoi'des, (y. ⊙.) leaves oblong, acute, entire, crenate, glabrous on the upper surface; peduncles solitary, axillary. 12-18 i. *S.*

MAL"VA. 15—13. (*Malvaceæ.*) [From *mollis,* soft.]

rotundifo'lia, (low mallows, r. w. J. ♃.) leaves heart-orbicular, obsoletely 5-lobed; peduncles bearing the fruit declined; stem prostrate. Probably introduced.

sylves"tris, (mallows, r-b. J. ♂. and ♃.) stem erect; leaves about 7-lobed, acutish; peduncles and petioles hairy. Ex.

cris"pa, (curled mallows, Au. ⊙.) stem erect; leaves angular, crisped; flowers axillary, glomerate. Ex.

coccin"ea, (r. Au. ♃.) hoary-tomentose, covered with stellate hairs; racemes terminal; stem diffuse. *S.*

moscha'ta, (musk mallows, ♃.) erect; radical leaves reniform, gashed; cauline leaves 5-parted, pinnate, many-cleft; leafets of the involucre linear. Naturalized.

virga'ta, (whip-stalk mallows, r. ♃.) leaves deeply 3-lobed, toothed, cuneate at the base; peduncles in pairs, longer than the petioles. Ex.

abutiloi'des, leaves with 5 angular lobes, tomentose; peduncles 2-cleft, generally 4-flowered; axillary capsules many-seeded. *S.*

carolin"iana, (r. Au. ⊙.) leaves 5-lobed or palmate, notched and toothed; peduncles longer than the petioles; petals entire; fruit villose; stem prostrate, branching. *S.*

triangula'ta, (p. Ju.) hirsute, sub-decumbent; lower leaves triangular cordate; upper ones 3-5-lobed, irregularly toothed; flowers racemed. 12-18 i. *S.*

peda'ta, (♃. p.) somewhat scabrous with stellate hairs; leafets pedately 5-7-parted; segments laciniately toothed; flowers on elongated peduncles in a loose panicle calyx naked, slightly hirsute. 2-4 f. *S.*

MAL'VAVIS"CUS. 15—12. (*Malvaceæ.*)

florida'nus, (r. ♃.) pilose, hirsute, herbaceous; leaves cordate-ovate, crenate-obtusish, small, short-petioled; peduncles axillary, nodding, towards the end of the branches. Florida.

MARCHAN"TIA. 21—3. (*Hepaticæ.*) [From Marchant, a naturalist.]

polymor"pha, (brook liverwort, g-y. Ju. ♃.) pistillate receptacles radiated; staminate ones peduncled, peltate; fronds crowded together, lobed, nerved, and covered with small decussate veins; pistillate peduncles very long; nerves of the frond generally brown. On earth and stones, in wet or damp places.

MARRU'BIUM. 13—1. (*Labiatæ.*) [From a Hebrew word, *marrob,* a bitter juice.]

vulga're, (horehound, w. Ju. ♄.) leaves round-ovate, toothed, rugose, veined; calyx toothed, setaceous, uncinate. Introduced.

MARSHAL"LIA. 17—1. (*Corymbiferæ.*)

lanceola'ta, (p. M. ♃.) stem simple, leafy below, naked near the summit; leaves of the root obovate, of the stem long, lanceolate; scales of the involucrum oval; chaff spatulate. 18-24 i. *S.*

latifo'lia, (Au. ♃.) stem simple; leaves oblong-lanceolate, acuminate, 3-nerved, lowest ones sheathing; scales of the involucrum acute; chaff of the receptacle linear. *S.*

angustifo'lia, (p. Ju. ♃.) stem branching; lower leaves narrow-lanceolate, upper ones linear; scales of the involucrum rigid, subulate; chaff linear. Var. *cyanan"thera,* corolla pale purple; anthers sky blue; stem simple, angular, very pubescent near the top; leaves lance-linear, 3-nerved; scales of the calyx lanceolate, acuminate. 2 f. *S.*

MARTYN"IA. 13—2. (*Bignoniæ.*) [In honor of the botanist, Martyn.]

probosci'dea, (martinoe, w. p. y. Ju. ⊙.) stem short, branching; leaves alternate, cordate, entire, villose; pericarp terminating in a long proboscis. 1-2 f. *S.*

MATRICA'RIA. 17—2. (*Corymbiferæ.*) [Named from its efficacy in the diseases of females.]

chamomil"la, (wild chamomile, w. M. ⊙.) leaves bi-pinnate; scales of the involucre obtusish. Ex.

MECONOP"SIS. 12—1. (*Papaveraceæ.*) [From *mekon,* a poppy, *opsis,* aspect, resembling a poppy.]

diphyl"la, (y. m. ♄.) leaves 2, glaucous, sessile, hairy; lobes rounded and obtuse, capsules 4-valved-echinate. 1 f.

petiola'tum, stem 4-sided; leaves very broad, long-petioled, pinnatifid-lobed. *S.*

heterophyl"la, (r. ♃.) leaves few and remote, pinnately divided; segments of the lower ones ovate, incised and petioled; of the upper linear, entire, somewhat confluent.

MEDEO'LA. 6—3 (*Asparagi.*)

virgin'ica, (Indian cucumber, g-y. m. ♄.) leaves in whorls, lance-oval, acuminate; pedicels aggregated, terminal; root white. 12-18 i.

MEDICA'GO. 16—10. (*Leguminosæ.*) [Called *medike*, by Dioscorides, on account of its supposed medicinal virtues.]

lupuli'na, (hop medick, y. J. ☉.) spikes oval; legumes reniform, 1-seeded; stipules entire; leaves obovate; stem procumbent.

intertex"ta, (y. Au.) stem procumbent; leafets obovate, toothed; stipules ciliate, toothed; peduncles somewhat 2-flowered; legume pilose, spiral, oval; spines straight, thick, rigid, and acute. Sandy fields. Conn. to Car. Introduced.

sati'va, (p. Ju. ♃.) peduncles racemed; legume smooth, cochleate; stipules entire; leaves oblong, toothed. Naturalized.

tribuloi'des, (hedge-hog, ☉.) peduncles 2-flowered; legume cochleate, cylindric, flat both sides, aculeate, conic 2-ways, reflexed; stipules toothed; leaves toothed, obovate. Ex.

scutella'ta, (snail-shell, bee-hive, Ju. ☉.) peduncles about 2-flowered; legumes unarmed, cochleate in an orbicular form, with a convex base and a flat top; stipules toothed; leaves oblong, toothed. Ex.

macula'ta, (p.) stem prostrate; leafets obcordate, toothed, spotted; stipules toothed; peduncles 3-5-flowered; legumes compactly spiral, furrowed on the margin, and fringed with a double row of long-curved spines; seeds reniform, yellowish. *S.*

denticula'ta, (p.) nearly glabrous; stem prostrate; leafets obcordate; stipules laciniate; peduncles 2 to 5-flowered; legumes broad, loosely-spiral and flat, with 1-3 convolutions, reticulated; the margin thin, keeled, with a double compact row of subulate-curved prickles. 1-2 f. *S.*

MELAMPY'RUM. 13—2. (*Pediculares.*) [From *melas*, black, and *puros*, wheat.]

america'num, (cow-wheat, y. Ju. ☉.) slender; lower leaves linear, entire; floral ones lanceolate, toothed behind; flowers axillary, distinct. Var. *latifo'lium,* has very broad leaves. Woods. *S.*

MELAN"THIUM. 6—3. (*Junceæ.*) [From *melas*, black, *anthos*, flower.]

virgin"icum, (g-y. black flower.) panicle pyramid-form, very large; petals ovate; leaves long, linear-lanceolate, flat, smooth; flowers become black. 3-4 f.

hybrid"um. (bunch-flower, w. J. ♃.) panicles racemose; petals sub-orbicular, plaited with long claws; glands connate. 2 f.

glau'cum, (g-w. Ju. ♃.) root a tunicated bulb; leaves glaucous, gramineous, margined; racemes mostly simple, few-flowered; segments of the perianth roundish, clawed, with two peculiar spots; seeds subulately-winged. 1-3 f. Northern lakes. Canada. Mich.

monoi'cum, (Ju. ♃.) panicle with the lower flowers sterile; upper ones fertile, racemed; petals oblong, flat with short claws; styles half the length of the germ. *S.*

MELANANTHE'RA. 17—1. (*Corymbiferæ.*) [From *melas*, black, and *anthos*, flower.]

hasta'ta, (w. S. ♃.) leaves hastate, 3-lobed; chaff of the receptacle lanceolate, acuminate. Var. *loba'ta,* leaves deeply 3-lobed. Var. *pandura'ta,* leaves slightly 3-lobed, panduriform. 4-6 f. *S.*

ME'LIA. 10—1. (*Meliæ.*) [From *meli*, honey.]

azed"arach, (pride of China, ♄.) leaves doubly pinnate; leafets smooth, ovate, toothed. 30-40 f. *S.*

MELI'CA. 3—2. (*Gramineæ.*)

specio'sa, (melic grass, J. ♃.) smooth; panicle loose, erect, few-flowered; branches simple; leaves flat, pubescent beneath; florets obtuse. 3-4 f. Charleston, S. C.

diffu'sa, (J. ♃.) panicle diffuse, very branching; stem erect, pubescent; flowers acute, beardless.

gla'bra, (large flowered melica, Ap.) stem glabrous; leaves narrow, scabrous; panicle erect, loose branches simple, few-flowered; flowers with the glumes unbearded. 2-3 f. *S.*

MELILO'TUS. 16—10. (*Leguminosæ.*) [From *meli*, honey, and *lotus*, a plant.]

officina'lis, (yellow melilot-clover, y. J. ☉.) stem erect, branching; leafets lanceolate, oblong; spikes axillary, paniculate; legume 2-seeded, rugose; flowers in long yellow racemes. 2-4 f.

al"ba, (white melilot-clover, w. J. ☉.) stem erect; leafets variable, (oval, ovate, obovate, and oblanceolate,) mucronately serrulate; banner longer than the wings; racemes axillary, panicled; the longest raceme 6 to 10 times as long as the longest leafet at its base; legumes oval. 3-6 f. Probably introduced, but now very common, and growing wild.

occidenta'lis, (y.) erect; leafets linear-oblong or obovate, serrate, truncate at the extremity; flowers minute; teeth of the calyx unequal, as long as the tube; legume 1-2 seeded, ovate-orbiculate, slightly wrinkled California.

MELIS"SA. 13—1. (*Labiatæ.*) [From *melissa*, a bee, because it affords honey.]

officina'lis, (balm, w. b. Ju. ♃.) flowers whorled half-way round, sub-sessile; bracts oblong, pedicelled; leaves ovate, acute, serrate. Naturalized.

MELO'THRIA. 19—15. (*Cucurbitaceæ.*) [From *melon*, fruit, and *thrion*, food.]

pendu'la, (small creeping cucumber, y. J. ☉.) leaves sub-reniform, lobed, and angled, slightly hispid; fruit oval, smooth, pendulous. A slender vine, running over small shrubs and herbs on the banks of streams; stem hairy; leaves petioled; tendrils 5-6 inches high; flowers axillary; the sterile in small racemes, the fertile solitary.

MENISPER"MUM. 20—12. [From *mena*, the moon, and *sperma*, seed; seed crescent-form.]

canaden"se, (moon-seed, y. Ju. ♃.) leaves peltate, cordate, round-angular; racemes compound; petals 8.

smilaci'num, (y. Ju. ♃.) racemes generally simple; petals 4-leaves peltate, somewhat glabrous, cordate, nearly round, obtusely angled, glaucous beneath. *S*

lyo'ni, (Ju. ♃.) racemes simple; petals

6; stamens 12; leaves palmate-lobed, cordate, very long petioled. *S.*

MEN″THA. 13—1. (*Labiatæ.*) [From Minthe, the daughter of Cocytus, who is said to have been changed into this herb.]

canaden″se, (w. p. Au. ♃.) flowers whorled; leaves lance-ovate, serrate, petioled, hairy; stamens as long as the corolla. Sandy soils. Stem 1 f.

borea′lis, (w. p. J. ♃.) ascending, pubescent; leaves petioled, ovate-lanceolate, acute at both ends, flowers in whorls, stamens exsert, twice as long as the corolla. Horse-mint.

piperi′ta, (peppermint, p. Au. ♃.) spikes obtuse, interrupted below; leaves subovate, somewhat glabrous, petioled; stem glabrous at the base. Naturalized. 1-2 f. Ex.

vir″idis, (spearmint, p. Au.) leaves lanceolate, sessile; spikes elongated, interrupted; stamens long. 1-2 f. Ex.

ten″uis, (America spearmint, w. J. ♃.) glabrous; leaves opposite, ovate-lanceolate, serrulate, petioled; spike slender, terminal, with verticils very small, distant at base; stamens shorter than the corolla. 1-2 f.

arven″sis, (field-mint, p. Ju.) hairy, branching; leaves ovate; flowers whorled; calyx bell-form. Naturalized. 1 f.

MENTZE′LIA. 11—1. (*Onagræ.*) [In honor of Dr. Mentzel.]

au′rea, (y.) stem dichotomous; leaves lance-ovate, deeply angular-crenate; flowers sessile; petals oval, acuminate, entire; plant rough. 12 i. *S.*

oligosper″ma, decumbent; flowers large. *S.*

MENYAN″THES. 5—1. (*Gentianæ.*) [From *mene,* mouth, and *anthos,* flower.]

trifo′liata, (buck-bean, r. J. ♃.) leaves ternate, petioled, sheathing, smooth; flowers pale, in a terminal raceme. Marshes.

MENZIE′SIA. 8—1. (*Ericæ.*) [Named by Smith, in honor of Menzies.]

cæru′lea, (mountain-heath, Ju. ♄.) stem branched, woody below; leaves scattered, crowded, linear, toothed; peduncles terminal, aggregate, 1-flowered, flowers bell-shaped, 5-cleft, decandrous; calyx very acute. An evergreen shrub, resembling the heath. White hills, N. H., and other cold, elevated regions. Flowers large, purple, on long, red peduncles.

globula′ris, leaves lanceolate, glaucous beneath, nerves pubescent; calyx 4-cleft; flowers globose, octandrous. Mountains. Penn. to Car. Shrub. 4 f. Flowers yellowish brown.

ferrugin″ea, leaves lance-obovate; flowers urceolate, octandrous. *S.*

empetrifor″mis, (r. Ju. ♄.) leaves linear, serrulate, concave beneath; peduncles terminal, aggregate; flowers bell-form; calyx obtuse, decandrous. *S.*

polifo′lia, (St. Daboec's heath,) flowers larger, and more globular than those of the common heaths. Found wild in Ireland.

MESEMBRYAN″THEMUM. 11—5. (*Ficoideæ.*) [From *mesembria* mid-day, and *anthos* flower, so called because its flowers expand at noon.]

crystali′num, (ice plant, w. Au. ☉.) branching; leaves alternate, ovate, papillose; flowers sessile; calyx broad-ovate acute, retuse. Ex.

pomeridia′num, (☉.) flowers of a brilliant yellow.

MES″PILUS. 11—5. (*Rosaceæ.*)

germani′ca, (medlar, ♄.) leaves lance-ovate, downy beneath; flowers sessile, solitary. Ex.

oxycan″tha, (English hawthorn.)

MICRAN″THEMUM 2—1. (*Lysimachiæ.*) [From *mikros,* small, and *anthos,* flower.]

orbicula′tum, (w. Au. ♃.) stem prostrate, terete; orbicular, abruptly narrowed at the base; flowers peduncled.

emargina′tum, (w. Au. ♃.) leaves oval and obovate, emarginate, sessile, flowers sessile; stem prostrate or creeping. Wet places.

MICROPE′TALON. 10—4. (*Caryophylleæ.*) [Named from the diminutive size of the petals.]

lanceola′tum, (blind starwort, Ju. ♃.) glabrous; leaves lanceolate, narrow at both ends; flowers panicled; petals ovate, very short or wanting. Damp. 6-8 i.

longifo′lia, (long-leaf starwort, w. J. ♃.) stem decumbent or sub-decumbent, leaves lance-linear, opposite, entire.

lanugino′sum, (Ju. ♃.) closely pubescent; leaves lanceolate, tapering to a petiole; peduncles generally solitary, long, finally reflected; flowers without petals. *S.*

MICROS″TYLIS. 18—1. (*Orchideæ.*) [From *mikros,* small, and *stulos,* style.]

ophioglossoi′des, (g-w. J. ♃.) scape 1-leafed; leaf ovate, amplexicaule; lip truncate, emarginate. Roots of trees.

brachypo′da. (Ju.) stem 1-leaved; racemes sub-spiked, lateral petals refracted; lip triangular-hastate, cucullate, acuminate.

MIE′GIA. 3—1. (*Gramineæ.*)

macrosper″ma, (cane, Ap. ♃.) stem terete-glabrous, hollow, rigid; leaves distichus, lanceolate, flat, sub-acuminate, pubescent underneath. 3-15 f. Var. *gigant″ea,* much taller. 30-40 f.

MIKA′NIA. 17—1. (*Corymbiferæ.*) [In honor of Professor Mikan of Prague.]

pubes″cens, (w-p. S. ♃.) stem climbing, pubescent; leaves cordate, acuminate, angularly dentate, pubescent on both sides: divaricate, equal.

scan″dens, (climbing thoroughwort, w Au. ♃.) stem glabrous, climbing; leaves cordate, toothed, acuminate.

MIL″LIUM. 3—2. (*Gramineæ.*)

effu′sum, (millet, Ju. ♃.) panicle diffuse, compound; branches horizontal, glumes ovate, very obtuse; paleas awnless, smooth and shining; leaves broad-linear. 5-8 f.

amphicar″pon, (Au. ♃.) leaves linear-lanceolate, hairy, ciliate; panicle simple, contracted, bearing perfect flowers; fertile flowers in solitary, elongated radical scapes, at length subterraneous; glumes acuminate. 1-2 f. Sandy swamps.

pun″gens (dwarf millet grass M. ♃)

culm erect; leaves lanceolate, very short, pungent, at length involute; panicle contracted; branches generally in pairs, 2-flowered; flowers awnless, ovate; paleas hairy. 12-18 i. Rocky hills.

ni'gricans, (African millet,) flowers in panicles, crowded; glumes shining, becoming black; leaves ensiform, very long. Ex.

MIMU'LUS. 13—2. (*Scrophulariæ.*) [From *mimus*, a mimic.]

rin''gens, (monkey-flower, b. Ju. ♃.) erect, glabrous; leaves sessile, lanceolate-acuminate, serrate; peduncles axillary, opposite, longer than the flower; teeth of the calyx acuminate. 1-2 f.

ala'tus, (b. Ju. ♃.) erect, smooth; leaves petioled, ovate, acuminate, serrate; stem square, winged. 2 f.

lute'us, (yellow monkey-flower,) erect, stoloniferous; leaves roundish-ovate, lower ones petioled-obtuse, upper ones sessile, acute.

lewis''ii, (p. Au. ♃.) erect, small, pubescent; leaves sessile, lance-oblong, nerved, mucronate-denticulate; flowers few, terminal, very long peduncled; teeth of the calyx acuminate. 6-8 i. *S.*

glutino'sus, a shrubby species with orange-colored flowers. Ex.

MIRAB''ILIS. 5—1. (*Nyctagines.*) [From the Latin *mirabilis*, wonderful.]

jal''apa, (four-o'clock, r. y. Ju. ♃.) flowers heaped, peduncled; leaves glabrous.

dichot''oma, (Mexican four-o'clock, ♃.) flowers sessile, erect, axillary, solitary. Ex.

longiflo'ra, (w. Au. ♃.) flowers crowded, very long, nodding; leaves sub-villose. Ex.

MITCHEL''LA. 4—1. (*Rubiaceæ.*) [In honor of the late Dr. Mitchell of New York.]

re'pens, (w. Ju. ♃.) stem creeping, branched; leaves smooth, roundish, opposite. Woods.

MITEL''LA. 10—2. (*Saxifragæ.*)

dyphyl''la, (w. M. ♃.) leaves somewhat lobed; lobes acute-dentate; stem erect, with two opposite leaves above the middle. 12-18 i.

cordifo'lia, (w. M. ♃.) radical leaves cordate, sub-3-lobed, doubly crenate; scape naked, or with a single leaf, scaly at the base; petals fimbriate-pinnatifid. 6-8 i.

prostra'ta, (Ju. ♃.) root creeping; stem prostrate; leaves alternate, round-cordate, sub-acute, obtusely sub-lobed. Canada.

MOLUCEL''LA. 13—1. (*Labiatæ.*) [From *moluca*, to bite, on account of its sharp taste.]

læ'vis, (shell-flower, w-g. Ju. ☉.) calyx campanulate, 5-toothed; teeth equal, awnless; leaves petioled, round-ovate, toothed.

MOLLU'GO 3—3. (*Caryophylleæ.*) [From *mollis*, soft.]

verticilla'ta, (carpet-weed, w. Ju. ☉.) leaves verticillate, wedge-form, acute; stem branched, depressed; peduncles 1-flowered.

MOMOR''DICA. 19—15. (*Cucurbitaceæ.*)

echina'ta, (w. Au. ☉.) pomaceous; berry 4-seeded, roundish, setose, echinate; leaves cordate, 5-lobed, angled, acuminate, entire; calyx 6-cleft; corolla 6-parted.

balsami'na, (balsam apple, S. ☉.) pomaceous; berry angled, tubercled; leaves glabrous, spreading, palmate. Ex.

MONAR''DA. 2—1. (*Labiatæ.*) [So called from Monardes, a Spanish botanist.]

did''yma, (mountain-mint, r. J. ♃.) leaves ovate, acuminate, sub-cordate, somewhat hairy; flowers in simple or proliferous heads; outer bracts large, colored, lanceolate. Var. *angustifo'lia*, leaves lance-ovate, acuminate, pubescent; stem pubescent. 18-24 i.

fistulo'sa, (y. Ju. ♃.) stem obtuse-angled, nearly smooth, hollow, leaves oblong-lanceolate, acuminate, coarsely serrate; calyx 5-toothed, long, curved, bearded; corolla rough, pale.

puncta'ta, (y-b. S. ♃.) nearly smooth; stem white, downy; leaves smooth; flowers whorled; bracts lanceolate, colored longer than the whorl; corolla yellow, dotted with brown; calyx 5-toothed, unequal.

hirsu'ta, (b-p. Au. ♃.) whole plant hairy leaves on long petioles; flowers small bracts short; calyx 2-lipped; lower lip 3-toothed. 2-3 f.

oblongata, (wild burgamot, b. r. Ju. ♃.) pubescent; heads simple; exterior bracts ovate; calyx short, with the throat bearded, teeth divaricate; stem obtuse-angled, hairy above; leaves oblong, lanceolate, rounded at the base. Rocky situations. 2-3 f.

clinopo'dia, (y. p. Ju. ♃.) smooth; heads simple, terminal; exterior bracts ovate, wide, acute, entire; corolla pubescent, slender; leaves ovate-oblong, acuminate, serrate, hairy; stem obtuse-angled, glabrous.

cilia'ta, (p. Au. ♃.) hirsute; flowers verticillate; bracts ovate, glabrous, ciliate, as long as the calyx; leaves ovate-oblong, tapering, serrate.

rugo'sa, (w. Ju. ♃.) smoothish; heads simple, middling size; outer bracts ovate-undulate; calyx smoothish; leaves ovate, sub-cordate, acute, rugose; nerves beneath and petiole pilose; stem acute-angled, smoothish. 4 f. Canada.

gra'cilis, (y-w.) very glabrous; heads lateral and terminal; exterior bracts linear, ciliate; corollas short; leaves linear, lanceolate-serrate; stem obtuse-angled, broad ovate, acuminate. *S.*

purpu'rea, (r. Ju. ♃.) somewhat glabrous; heads large, leafy; outer bracts large, colored, serrate; calyx colored; throat bearded; corolla long, nearly glabrous; leaves oblong-ovate, coarsely serrate; stem acutely angled. *S.*

MONOCE'RA. 3—2. (*Gramineæ.*) [From *monos*, one, and *keras*, horn.]

aromat''ica, (J. ♃.) spikes solitary; spikelets about 6-flowered; flowers awned, bearded at the margin; outer paleas roughened by glands awned on the back. *S.*

MONOTRO''PA. 10—1. (*Ericæ.*)

uniflo'ra, (bird's nest, Indian-pipe, w. J ♃.) stem 1-flowered; flower nodding at first, at length erect; scales of the stem approximate. Whole plant ivory white at first. 4-8 i.

morrisonia'na, (J. ♃.) scape long, straight, 1-flowered; scales distant; flowers erect; stamens 10-12. Shady woods.

lanugino'sa, (y-w. Ju. ♃.) scape bearing flowers in a spike; bracts and flowers hairy on all sides. Parasitic on roots.

europe'a, (y. J. ♃.) scape bearing flowers in a spike; flowers and scales on the stem glabrous outside; lateral flowers octandrous. Canada.

MONOTROP″SIS. 10—1. (*Ericæ.*)

odora'ta, (r-w. Mar.) flowers bell-form. in aggregate heads. 3-4 i. *S.*

MON″TIA. 3—3. (*Portulacceæ.*)

fonta'na, (false spring-beauty,) leaves opposite; flowers axillary, small.

MO'RUS. 19—4. (*Urticæ.*) From *mauros*, black, so called from the color of the fruit of one of its species.]

nigra, (black mulberry, Ju. ♄.) leaves heart-form, ovate, or sub-5-lobed; unequally toothed, scabrous. Ex.

al″ba, (white mulberry, M. ♄.) leaves heart-form, with oblique bases, ovate or lobed, unequally serrate, smoothish. From China and Persia. Naturalized. 15-20 f.

ru'bra. (red mulberry, M. ♄.) diœcious; leaves cordate, ovate-acuminate, often 8-lobed, equally serrate, scabrous, pubescent beneath; fertile aments cylindric. 15-30 f.

multicau'lis, (many-stemmed mulberry, ♄.) leaves cordate, ovate, acuminate, crenate, serrate, net-veined; sub-scabrous and pimpled beneath, sub-scabrous above; sprouts proliferous. 8-16 f. Leaves sometimes 12-14 inches long.

MU'COR. 21—6. (*Fungi.*)

aspergil″lus, (mould,) stipe filiform, dichotomous; little heads terminal, sub-conjugate, oblong when mature. On putrid fungi in autumn.

MUH'LENBERG″IA. 3—2. (*Gramineæ.*) [In honor of Henry Muhlenberg, D.D., a distinguished botanist of Lancaster, Penn.]

diffu'sa, (dropseed grass, S. ♃.) culm decumbent, branching, diffuse; leaves lance-linear; panicles terminal and lateral, slender; branches appressed; awns about as long as the paleas. 12-18 i.

erec″ta, (Au. ♃.) culm erect, simple, leaves lanceolate; panicle terminal, simple, racemed; awn twice as long as the palea; upper palea awned at the base. 2-3 f.

MYLOCA'RIUM. 10—1. (*Ericæ.*) [From *mule*, a mill, and *karua*, a kernel.]

ligustri'num, (buckwheat-tree, w. M. ♄.) leaves perennial, alternate, sessile, entire, glabrous; racemes simple, terminal. 6-15 f. *S.*

MYOSO'TIS. 5—1. (*Boragineæ.*) [From *mus*, a mouse, *ous* (*otos*), an ear, the leaves being hairy like a mouse's ear.]

arven″sis, (forget-me-not, w-b. J. ☉.) seeds smooth; calyx-leaves oval, acuminate, very hirsute, longer than the tube of the corolla; stem very branching; racemes conjugate; leaves lance-oblong, hirsute. 4-8 i.

palustris, (scorpion-grass, b. M. ♃.) leaves lance-oval, rough; border of the corolla longer than the tube; flowers very small, bright blue. Wet grounds.

suffrutico'sa, stem very branching, suffruticose, hirsute; leaves lance-linear, hispid-pillose; spikes terminal, many flowers on pedicels; calyx closed; nut smooth, ovate. 8 i.

na'na, (b. and y. ♃.) leaves oblong villose, racemes few-flowered; nut smoothish; margin serrulate. *S.*

MYOSU'ROS. 5—12. (*Ranunculacæ.*) [From *mus*, mouse, and *oura*, tail.]

mini'mus, (Ap. ☉.) leaves linear, entire, seed 1-flowered; stamens 5-8; petals anther-form. 2-4 i. *S.*

MYRI'CA. 20—4. (*Amentaceæ.*) [The name is derived from the Greek; its original meaning is uncertain.]

ga'le, (Dutch-myrtle, sweet-gale, M. ♄.) leaves wedge-lanceolate, serrate at the apex, obtuse; sterile aments imbricated; scales acuminate, ciliate; fruit in scaly heads, with a strong aromatic odor. 4-5 f. Bogs, mountains, and lakes.

cerife'ra, (bayberry, wax-myrtle, g-p. M ♄.) leaves acute; sterile aments loose, scales acute; fruit globular, naked. On boiling, a pleasant-flavored wax is obtained which is used either alone or with tallow in making candles. 5-18 f.

carolinien″sis, (Ap. ♄.) leaves cuneate oblong, coarsely-toothed; staminate aments loose; scales acute; fruit globular, large. 3-5 f.

penn″sylva'nica, (M. ♄.) leaves oblong acutish at each end, very entire or sparingly sub-serrate at the apex, revolute at the margin; staminate aments loose; scales acute; fruit globular, large. 3 f.

MY'RIOPHYL″LUM. 19—12. (*Onagræ.*) [From *murios*, innumerable, and *phullon*, leaf, from the great number.]

verticilla'tum, (water milfoil, Ju. ♃.) leaves pinnate, capillary, upper ones pectinate-pinnatifid; flowers axillary, verticilate, upper ones staminate-octandrous.

tenel″lum, (Ju. ♃.) erect, nearly leafless, bracts entire, obtuse; petals linear, conduplicate and revolute; flowers mostly perfect, tetrandrous. 4-12 i.

scabra'tum, (J. p. ♃.) leaves pinnatifid flowers verticillate-axillary; upper ones staminate, tetrandrous; lower ones pistillate; fruit 8-angled. 12 i. *S.*

MYR″TUS. 11—1. (*Labiatæ.*) [From *muros*, perfume.]

commu'nis, (myrtle, w. Ju. ♄.) flowers solitary; involucrum 2-leaved; leaves ovate Ex.

NA'JAS. 19—1. (*Aroideæ.*) [From *Nais*, a water nymph.]

canaden″sis, (water nymph,) small, filiform; leaves narrow-linear. Canada.

NARCIS″SUS. 6—1. (*Narcissi.*) [From *Narkissos*, a beautiful youth, according to mythology, changed into this flower.]

pseudo-narcis″sus, (daffodil, M. ♃.) spatha 1-flowered; nectary bell-form, erect, crisped, equalling the ovate petals. Ex.

tazet″ta, (polyanthos, M. ♃.) spatha many-flowered; nectary bell-form, plicate truncate, thrice as short as the petals; petals alternately broader; leaves flat. Ex

jonquil″la, (jonquil, M. ♃.) spatha many flowered; nectary bell-form, short; leaves subulate. Ex.

poet″icus, (poet's narcissus, ♃.) spatha 1-flowered; nectary wheel-form, very short, scarious, crenulate; leaves inflexed at the margin. Ex.

NAR″DUS. 3—1. (*Cyperoideæ.*) [From *nardos*, spikenard, a term applied to aromatic grasses.]

stric′ta, (mat grass, ♃.) spike setaceous, straight; flowers 1-sided.

NARTHE′CIUM 6—1. (*Junceæ.*) [From *narthex*, fennel.]

america′num, (y. Ju. ♃.) racemes lax, sometimes interruptedly spiked; pedicels with a setaceous bract below the flower, and another embracing the base; filaments with very short hair; leaves narrow-ensiform; flowers in a terminal spike or raceme; scape 1 f. Sandy swamps.

NASTUR″TIUM. 14—2. (*Cruciferæ.*)

officina′le, (w. Ju. ♃.) leaves pinnate; leafets ovate, sub-cordate repand; stem decumbent; petals longer than the calyx.

palus″tre, (y. Au. ♃.) leaves lyrate-pinnatifid; lobes confluent, unequally dentate, smooth; petals as long as the calyx; siliques short, turgid; root ensiform. 1-2 f.

amphib″ium, (y. Ju. ♃.) leaves oblong-lanceolate, pinnatifid or serrate; root fibrous; petals longer than the calyx; siliques elliptical. 1-2 f.

his″pidum, stem tomentose-villose; leaves somewhat villose, runcinate-pinnatifid; lobes rather obtusely-toothed; siliques ovate, tumid; petals not quite as long as the calyx.

sylves″tre, (y.) leaves pinnately divided; segments lanceolate, serrate, or incised; petals longer than the calyx; siliques oblong, somewhat torulose; style very short. Introduced.

tanacetifo′lium, (M. ♂. y.) leaves pinnately divided; segments sinuate-pinnatifid or toothed; siliques oblong-linear, nearly erect, acute; style short. *S.*

sessiliflo′rum, (y.) leaves cuneate-obovate, obtuse, repand-toothed or nearly entire; siliques sub-sessile, linear-oblong, obtuse, tipped with the nearly sessile stigma. *S.*

NEC″TRIS. 6—2. (*Ranunculaceæ.*) [From Gr. *nekton*, swimming or floating.]

aquat″ica, (g-w. M. ♃.) submersed leaves opposite, many-parted, capillary; floating ones alternate, elliptic, peltate; flowers in racemes. *S.*

NEGUN″DO. 20—5. (*Acerineæ.*)

califor″nicum, young leaves villose, 3-foliate; leafets 3-lobed; lobes incised or toothed. California. *S.*

NELUM″BIUM. 12—12. (*Ranunculaceæ.*)

lute′um, (water chinquepin, sacred bean, Indian lotus, w. y. Ju. ♃.) corolla many-petalled; anthers produced in a linear appendage of the extremity; leaves peltate-orbicular, very entire. Lakes. Flowers larger than those of any other plant in North America, except one species of magnolia.

penta′petalum, (w. Ju. ♃.) leaves peltate, orbicular, entire; calyx 5-sepalled petals 5. *S.*

NEMOPAN″THES. 4—4 (*Rhamni.*) [From *nemos*, grove, and *pantos* (from *pas*), all, common in all groves.]

canaden″sis, (wild holly, Canadian holly g-y. M. ♄.) leaves deciduous, ovate-oblong very entire, smooth, mucronate; peduncles sub-solitary, very long 1 flowered; fruit obtusely quadrangular. Berries deep red. 3-6 f.

NEMOPHI′LA. 5—1. (*Boragineæ.*) [From *nemos*, a grove, and *phileo*, to love; so called from its habit.]

panicula′ta, (b. M. ♂.) very hairy; radical leaves sub-pinnatifid, cauline ones angularly lobed; divisions of the calyx with minute, oval appendages; flowers on short peduncles, somewhat paniculate. Moist woods.

phaceloi′des, (b. M. ♂.) succulent; stem 3-sided; leaves alternate, pinnatifid; peduncles very long, 1-flowered, opposite the leaves, and terminal.

NEOT″TIA. 18—1. (*Orchideæ.*) [The name is from the Greek, and signifies bird's nest.]

torti′lis, (summer ladies'-tresses, w. Ju. ♃.) radical leaves linear; scape sheathed; flowers spirally secund; lip somewhat 3-lobed; middle lobe larger, crenulate. 12 i.

gra′cilis, (ladies'-tresses, w. Ju.) radical leaves ovate; scape sheathing; flowers in a spiral row; lip obovate, curled; scape 8-12 inches, with a few sheathing leafets or scales; leaves on short petioles, sometimes falling off before the plant blossoms; flowers in a twisted spike. Var. *secun″da*, spike scarcely twisted, flowers more slender. Dry woods.

cer″nua, (nodding ladies'-tresses, w. Au. ♃.) leaves lanceolate, nerved; flowers in a dense spike, nodding, lip oblong, entire, acute.

odora′ta, (w.) stem leafy, glabrous; leaves lanceolate, acuminate, radical ones very long; spike somewhat loose; flowers recurved; lip ovate, entire; margin undulate, sub-fimbriate. *S.*

NEPE′TA. 13—1. (*Labiatæ.*) [Name is said to have been derived from Nepet, a town in Tuscany.]

cata′ria, (catmint, catnep, b-w. ♃.) hoary-pubescent; flowers in whorled spikes; leaves petioled, cordate, tooth-serrate.

NICOTIA′NA. 5—1. (*Solaneæ.*) [From Nicot, who first introduced it into Europe.]

taba′cum, (Virginian tobacco, w-r. Ju ☉.) leaves lance-ovate, sessile, decurrent; flowers acute. Naturalized at the north.

rus″tica, (common tobacco, g-y. Au. ☉.) viscid-pubescent; stem terete; leaves petioled, ovate, very entire; tube of the corolla cylindrical, longer than the calyx; segments round, 12-18 i. Flowers in a terminal panicle or raceme. Introduced.

panicula′ta, (small-flowered tobacco, w-r. Ju. ☉.) leaves petioled, cordate, entire; flowers on pedicels, obtuse, clavate. Ex.

quadrival″vis, (b-w. Ju. ☉.) leaves oblong-ovate, petioled; flowers scattered, solitary, near the summit of the branches; co rolla funnel-form; divisions oblong, acutish; capsule sub-globose, 4-valved. *S.*

NIGEL''LA. 12—4. (*Ranunculaceæ.*) [From *niger*, black, on account of its black seed.]

damasce'na, (fennel-flower, lady-in-the-green, b. M. ⊙.) flowers surrounded with a leafy involucrum, composed of linear bracts.

sati'va, (nutmeg-flower,) pistils 5; capsules muricate; roundish leaves sub-pilose, pinnatifid.

NOLI'NA. 6—3. (*Junci.*)

georgia'na, (W. M. ♃.) leaves long-linear, coriaceous, dry; scape with small subulate scales near the base; panicle racemose, spreading. 2-3 f.

NOS''TOC. 21—4 (*Algæ.*)

commu'ne, on the earth; frond ventricose, gelatinous. On the earth after a storm; an inch or two in extent; olive green.

NU'PHAR. 12—1. (*Papaveraceæ.*) [From the Greek, signifying water-lily.]

kalmia'na, (water-lily, Kalm's water-lily, Ju. ♃.) leaves cordate, lobes near each other; calyx 5-leaved; stigma gashed, with 8-12 radiated lines; leaves and flowers small.

lute'a, (yellow water-lily, y. Ju. ♃.) calyx with 5 obtuse sepals; stigma entire, 16-20 rayed; leaves cordate-oval; petals much smaller than the sepals, truncate. Water.

adve'na, calyx with 6 sepals; petals numerous, small; petioles semi-cylindrical.

sagittæfo'lia, (y. Ju. ♃.) leaves long, cordate-sagittate, obtuse; calyx 6-sepalled; petals none; anthers sub-sessile; stigma entire. Water. *S.*

NUTTAL''LIA. 15—12. (*Malvaceæ.*) [In honor of Thomas Nuttall.]

digita''ta, (r. M. ♃.) glaucous; lower leaves obsoletely digitate, sub-peltate; divisions linear; segments glabrous; upper leaves 3-parted and simple; peduncles somewhat racemed, very long. Poppy-like. 3-4 f.

NYMPHÆ'A. 12—1. (*Papaveraceæ.*) [From *numpha*, water-nymph.]

odora'ta, (pond-lily, w. Ju. ♃.) leaves round-cordate, entire, sub-emarginate; lobes spreading asunder, acuminate, obtuse; petals equalling the 4-leaved calyx; stigma 16-20-rayed; flowers large, odorous. The Egyptian lotus belongs to this genus.

NYS''SA. 20—5. (*Æliagni.*)

multiflo'ra, (sour or black gum, y-g. M. ♄.) leaves lanceolate, very entire, acute at each end; the petiole margined, and midrib villose; fertile peduncles many-flowered; flowers in umbellate clusters; drupe nearly round, dark blue. Low woods. 30-50 f.

biflo'ra, (tupelo-tree, swamp horn-bean,) leaves ovate-oblong, very entire, acute at each end, smooth; fertile peduncles 2-flowered; drupe oval, compressed. Swamps. 30-50 f.

aquat''ica, (M. ♄.) leaves oblong-lanceolate, entire, acute at each end, glabrous; fruit bearing peduncles 2-flowered

capita'ta, (M. ♄.) leaves on short petioles, oblong-lanceolate and oval, nearly entire, pubescent and somewhat hoary beneath; staminate florets capitate; pistillate 1-flowered. *S.*

tomento'sa, (M. ♄.) leaves on long petioles, oblong, acuminate, acutely toothed, tomentose beneath; fruit bearing peduncles 1-flowered. *S.*

uniflo'ra, (Ap. ♃.) leaves on long petioles, oblong, acuminate, sparingly and angularly toothed, slightly pubescent beneath, lower ones sometimes cordate; fruit bearing peduncles 1-flowered. Swamps. *S.*

OBOLA'RIA. 13—2. (*Pediculares.*)

virgin''ica, (penny-wort, r. Ap. ♃.) stem simple; leaves oblong, truncate fleshy, purple beneath; flowers axillary, solitary sessile. 3-4 i.

OCY'MUM. 13—1. (*Labiatæ.*) [From *okus*, swift, on account of its rapid growth.]

basil''icum, (basil, ⊙.) leaves ovate, glabrous; calyx ciliate. 6-12 i.

ŒNAN''THE. 5—2. (*Umbelliferæ.*)

sarmento'sa, stem branching, weak, somewhat climbing; leaves gash-bipinnate; segments ovate, dentate, terminal one somewhat 3-lobed; umbels opposite the leaves, many-rayed; involucre 0; fruit oblong; style very long.

filifor''mis, (w. Au. ⊙.) leaves simple, terete, jointed, acute; nut winged. Harper's Ferry.

ŒNO'THERA. 8—1. (*Onagræ.*)

Capsules elongated, sessile.

bien''nis, (scabish, tree-primrose, y. J. ♂.) stem villose, scabrous; leaves lance-ovate flat-toothed; flowers sub-spiked, sessile; stamens shorter than the corolla. 3-5 f.

parviflo'ra, (y. Ju. ♂.) stem smooth, sub villose; leaves lance-ovate, flat; stamens longer than the corolla.

grandiflo'ra, (y. Ju. ♂.) stem nearly smooth, branched; leaves ovate-lanceolate, glabrous; flowers axillary, sessile, large, petals obcordate; stamens declining, shorter than the corolla. 2-3 f. Introduced.

murica'ta, (y. Ju. ♂.) stem purplish, muricate; leaves lanceolate, flat; stamens as long as the corolla. 1-2 f.

sinua'ta, (y. J. ⊙.) stem diffuse, pubescent; leaves oval-oblong, toothed and sinuate; flowers axillary, villose; capsules prismatic. Var. *min''ima*, stem low, simple, 1-flowered; leaves entire.

Capsules obovate, clavate, angular, mostly pedicelled.

frutico'sa, (shrubby œnothera, sun-drop y. Ju. ♃.) pubescent; stem branching from the base, divaricate; leaves sessile, lanceolate, acute, slightly toothed, pilose; flowers in a terminal raceme; petals broad-obcordate. Shady woods. Stem 12-18 inches high, purple. Var. *ambig''ua*, has smaller flowers.

hybri'da, stem erect, villose; leaves pubescent on both sides, lanceolate, remotely toothed, undulate; capsules somewhat spiked; flowers pale yellow. 9-18 i *chrysan'tha*, (dwarf-scabish) stem slender, minutely pubescent; leaves lanceolate, rather obtuse, flat, entire; segments of the calyx twice as long as the tube; capsule sessile; flowers small, bright yellow. Mountains.

inca'na, (y.) stem slender, erect; leaves flat, hoary and tomentose, very entire, elliptic-ovate, acute; raceme few-flowered, naked; capsules sub-sessile, oblong, quadrangular. 6-8 i.

pu'mila, (y. Ju. ♃.) smooth; stem ascending; leaves lanceolate, entire, obtuse; capsules obovate, angled, sub-sessile. 8-12 i.

longifo'lia, (y. Au. ♂.) leaves lance-ovate denticulate; stem simple, very hairy; petals not in contact at the base, 2-lobed. Ex.

glau'ca, (y. ♃.) very glabrous; leaves broad oval, repand-denticulate, smooth, glaucous; capsule ovate quadrangular, pedicelled. *S.*

linea'ris, (y. Ju. ♃.) pubescent, slender; leaves linear, entire; capsules long-peduncled, roundish, 4-angled, villose; corolla large. *S.*

cæspito'sa, (w. r. Ju. ♃.) stemless; leaves lanceolate, gash-toothed; capsules oblong, sessile; tube of the calyx long; petals 2-lobed, distant. *S.*

pinnatifi'da, (w. J. ♂.) minutely pubescent; stem decumbent; radical leaves nearly entire; cauline ones pinnatifid; divisions linear, acute; capsules prismatic, grooved. 6-24 i. *S.*

frase'ri, (Ju. ♃.) nearly glabrous; stem near the base simple; leaves ovate, petiolate, denticulate; racemes leafy; capsules pedicelled, obovate, quadrangular. *S.*

macrocar''pa, (y. Au. ♂.) nearly glabrous; stem branching; leaves lanceolate, petioled, distantly glandular-denticulate, white-silky on the margin and nerves; petals obcordate, pointed; capsules elliptic, 4-winged, very short pedicels. *S.*

trilo'ba, (y. M. ☉. ♃.) stemless; leaves interruptedly pinnatifid, toothed, glabrous; petals 3-lobed at the apex; capsules 4-winged, large. *S.*

specio'sa, (w. J. ♃.) finely pubescent; leaves lance-oblong, toothed, sub-pinnatifid; raceme naked, at first nodding; capsules obovate, angled; stem suffruticose. *S.*

linifo'lia, (y. J. ♂.) leaves entire; radical ones lanceolate; cauline ones linear, crowded; raceme naked, terminal; capsule obovate, angled, pubescent; petals obcordate, longer than the stamens; stigma 4-lobed. *S.*

serrula'ta, (y. J.) leaves linear, somewhat spinose-serrate, acute; flowers axillary; sepals keeled; stigma 4-lobed; capsules cylindric, erect; stem suffruticose. *S.*

humifu'sa, (w.) stem prostrate, branching, villose; leaves lance-linear, sub-dentate or entire, silky-villose; flowers axillary; calyx villose; tube longer than the germ; capsule prismatic. *S.*

suaveo'lens, (y.) stem, calyx, and capsule, sub-pillose, leaves lance-ovate, obsoletely-toothed; petals large, emarginate; capsules elongated, furrowed, nearly uniform in thickness. Cultivated.

noctur''na, and *villo'sa*, both biennial plants, natives of Good Hope.

acau'lis, (♃.) a native of Chili.

OLEA 2—1. (*Jasmineæ.*) [Name from the Celtic word *olea*, signifying oil.]

america'na, (American olive, w. M. ♄.) leaves lanceolate-elliptic, entire; racemes compressed; bracts all persistent, connate, small. *S.*

europe'a, leaves lanceolate, entire; racemes axillary, crowded. The drupes when green are used for pickles, when ripe they afford the oil called olive oil Ex.

ONO'CLEA. 21—1. (*Felices.*) [From *onos*, a vessel, and *kleid*, to close.]

sensib''ilis, (sensitive fern, J. ♃.) barren frond pinnate; fertile one doubly pinnate; stem glabrous. The leafets slowly approach each other on pressing the stem in the hand.

obtusilo'ba, barren frond pinnate; fertile one doubly-pinnate; stem scaly.

ONOPOR''DON. 17—1. (*Cinarocephalæ.*)

acan''thium, (cotton thistle, p. Ju. ♂.) calyx scaly, scales spreading; leaves ovate-oblong, sinuate. Naturalized. Ex.

ONOSMO'DIUM. 5—1. (*Boragineæ.*)

his''pidum, (y-w. J. ♃.) very hispid; leaves lance-oval, acute, papillose, punctate; segments of the corolla subulate. 1-2 f.

mol''le, (w. Ju. ♃.) whitish villose; leaves oblong-oval, somewhat 3-nerved; segments of the corolla sub-oval.

OPHIOGLOS''SUM. 21—1. (*Filices.*) [From *Ophis*, serpent, and *glossa*, tongue.]

vulga'tum, (adder-tongue fern, ♃.) spike cauline; frond oblong-ovate, obtuse, closely reticulate.

bulbo'sum, (♃.) root bulbous; frond heart-ovate, obtuse; spike cauline. 6 i.

pusil''lum, spike cauline; frond cordate. 1 i. *S.*

OPHIORHI'ZA. 5—1. (*Gentianæ.*) [From *ophis*, serpent, and *riza*, root, because the root is used as a specific against the bite of the viper in Judea.]

mitreo'la, (w. Ju. ☉.) leaves ovate, sessile with the margins scarious; stem erect. 12-18 i. *S.*

lanceola'ta, (w-p. Au. ☉.) leaves long, lanceolate, finely serrulate, tapering at base. 18 i. *S.*

OPLOTHE'CA. 15—5. (*Geraniæ.*)

florida'na, (w. Ju.) stem erect, pubescent, with tumid joints; leaves sessile, lance-linear, scabrous above, lanuginous beneath 3-4 f.

OR''CHIS. 18—1. (*Orchideæ.*) [A name derived from the Greek.]

spectab''ilis, (r. M. ♃.) lip obovate, undivided, crenate, retuse; petals straight lateral ones longest; spur clavate, shorter than the germ; bracts longer than the flowers; stem leafless. 3-6 i

tridenta'ta, (w. Ju. ♃.) lip ovate-lanceo late, obtuse, 3-toothed; petals obtuse; spur filiform, longer than the germ. 6-12 i.

fla'va, (y. Ju. ♃.) lip 3-cleft, entire; middle division larger; spike compact; bracts longer than the flower. 1-2 f.

fimbria'ta, (p. Ju. ♃.) lip 3-parted; lobes all incisely fimbriate and wedge-form; segments of the perianth oval, spreading, fimbriate-toothed; spur filiform, clavate, longer than the germ; leaves broad-lanceolate; purple flowers, in a large spike. 2 f. Meadows.

obsole'ta, (J. ♃.) lip oblong, lanceolate, undivided; petals erect; horn obtuse, as long as the germ; bracts very short; root oval or palmate.

vires''cens, (g. Ju. ♃.) lip lanceolate, crenate; petals connivent; bracts longer than the flowers; spur sub-inflated, obtuse; root fascicled. 12-18 i.

hyperbo'rea, (g-y. Ju. ♃.) lip lanceolate, as large as the spreading petals; spur subulate, shorter than the germ; spike ovate; bracts as long as the flowers; roots fascicled.

obtusa'ta, (♃.) lip linear, very entire, longer than the horn which is the length of the germ; leaf solitary, radical, sub-wedge-form, obtuse; roots fascicled.

rotundifo'lia, (♃.) lip 3-cleft, middle segment 2-cleft; spur shorter than the germ; leaves roundish-oval; root fascicled.

nive'a, (w.) lip linear, oblong, entire; petals spreading; horn filiform, longer than the germ; lower leaves linear, very long, upper ones subulate. *S.*

vir''idis, (g-w. Ju.) lip linear, 3 toothed at the apex; petals connivent; horn obtuse, sub-inflated; bracts much longer than the flowers; root fascicled. 3 i. *S.*

bidenta'ta, lip oval, oblong, 2-toothed at the base; petals ovate, expanding; horn shorter than the thickened germ; leaves narrow-lanceolate; stem nearly naked. 12-18 i. *S.*

See Habenaria.

ORIGA'NUM. 13—1. (*Labiatæ.*) [From *oros*, a mountain, and *gano*, to rejoice, so called because it grows upon the mountain sides.]

vulga're, (wild marjoram, r. Ju. ♃.) spikes round, panicled, heaped; bracts ovate, longer than the calyx. 1-2 f.

majora'na, (sweet marjoram, ♄.) spikes roundish, ternate, compact, peduncled; leaves petioled, oval, obtuse, smoothish. 12 i. Ex. A native of Portugal.

ORNITHOG''ALUM. 6—1. (*Asphodeli.*) [From *ornis*, a bird, and *gala*, milk, from the color of its flowers.]

umbella'tum, (star of Bethlehem, M. ♃.) flowers corymbed; peduncles longer than the bracts; filaments subulate. Naturalized. 6-8 i.

bractea'tum, (p. ♃.) scape bracted, 1-flowered, terete; petals lance-oblong, obtusish; filaments linear; leaves channeled, filiform. 4 i. *S.*

pyramida'le, (prussian asparagus,) a native of Spain.

latifo'lium, a native of Egypt.

cauda'tum, Cape of Good Hope.

OR'NUS. 2—1. (*Jasmineæ.*) [From the Hebrew *orn*, an ash.]

america'na, (M. ♄.) leafets broad-ovate, serrate, terminal one obcordate. Shady woods. Resembles the genus fraxinus.

europe'a, affords the manna of commerce. The American ornus is thought by some to be but a variety of this. Ex.

OROBAN''CHE. 13—2 (*Pediculares.*) [From *orobos*, the wild pea, and *agchein*, to suffocate, so called because it twines around the orobos and destroys it.]

uniflo'ra, (cancer-root, b-w. M. ♃.) stem very short; peduncles 2, elongated, scape-form, 1-flowered, naked; scales smooth, concave; lobes of the corolla oblong-oval with a pubescent, colored margin. 4-6 f Parasitic. Woods.

america'na, (Ju. ♃.) stem simple, covered with ovate-lanceolate, imbricate scales, spike terminal, smooth; corolla recurved stamens exserted; flowers brownish yellow the spike covered by the scales of the stem 6-8 i. Parasitic. Woods.

ludovicia'na, (p.) pulverulent, pubescent, stem low, simple; flowers and ovate-acute scales sub-imbricate; calyx 2-bracted; corolla recurved; stamens enclosed, smooth 3-4 i.

fascicula'ta, (p. Ju.) stem short, simple; peduncles numerous, naked, nearly terminal, about the length of the stem; scales few, ovate, concave, pubescent. 4-5 i.

ma'jor, stem erect, somewhat scaly and bulbous at the base, terminating in a spike of rather large purplish or brownish flowers. Parasitic. Ex.

ru'bra, very fragrant, similar in appearance to the preceding species. Ex.

ORO'BUS. 16—10. (*Leguminosæ.*) [From *erepto*, to eat, the root being considered nutritious.]

dis''par, (ervum, w-y. J. ♃.) leaves unequally pinnate; leafets linear, obtuse; stipules ovate, acute; racemes sessile.

tubero'sus, the heath-pea. The Scotch islanders chew the root; they hold the plant in high esteem. Ex.

ORON''TIUM. 6—1. (*Aroideæ.*) [From *Orontes.*]

aquat''icum, (golden club, y. M. ♃.) leaves all radical, lance-ovate; scape cylindrical, spiked; flowers with a peculiar smell. Water. 1-2 f.

ORTHOCAR''PUS. 13—2. (*Pediculares.*) [From *orthos*, erect, and *carpos*, fruit.]

lute'us, (y. Ju.) stem simple, terete, hirsute; leaves alternate, sessile, acute, entire, calyx, bracts and leaves viscid-pubescent. 12-14 i. *S.*

ORY'ZA. 6—2. (*Gramineæ.*) [From *orez*, Arabian.]

sati'va, (rice, ☉.) culm jointed; leaves clasping; panicle terminal. Ex.

ORYZOP''SIS. 3—1. (*Gramineæ.*) [From *oruza*, rice, and *opsis*, resemblance.]

asperifo'lia, (mountain rice, M. ♃.) culm nakedish; leaves rigid, erect, pungent at the point; flowers in a racemose panicle. 18 i.

OSMORHI'ZA. (See Urasper''mum.)

OSMUN''DA. 21—1. (*Filices.*) [From Osmund, who first used it as a medicine.]

cinnamo'mea, (flowering fern, y. J ♃.)

barren frond doubly pinnatifid; segments oval, entire; fertile fronds with opposite racemes, woolly. 3-6 f.

clayto′nia′na, (♃.) fronds pinnate, bearing fruit at the summit, pinnate-pinnatifid, having small dense masses of fulvous down at their origin. 20-30 i.

rega′lis, (r-y. J. ♃.) frond bipinnate, terminal in several racemes, very branching, without hairs. Wet.

OS″TRYA. 19—12. (*Amentaceæ.*) [From *oseon*, a bone, on account of its hardness.]

virgin″ica, (iron-wood, hop-hornbeam, g. M. ♂.) leaves alternate, ovate-oblong, subcordate, acuminate, unequally serrate; strobilums oblong-ovate. A small tree, with very hard and heavy wood. Fertile flowers enlarged into a sort of oblong cone, resembling the common hop. Woods. Can. to Car.

OXA′LIS. 10—5. (*Gerania.*) [From *oxus*, sour, on account of the juice.]

acetosel″la, (wood-sorrel, w. r. M. ♃.) stemless; scape 1-flowered, longer than the leaves; leaves ternate, broad-obcordate, with rounded lobes; styles as long as the inner stamens; root dentate.

viola′cea, (violet wood-sorrel, p. J. ♃.) stemless; scape umbelliferous, 3-9 flowered; flowers nodding; leaves ternate, obcordate, smooth; styles shorter than the outer stamens. Scape 4-6 i. Rocky woods.

stric″ta, (upright wood sorrel, y. J. ☉.) hairy; stem erect, sometimes procumbent, branched; umbels about as long as the leaves; leaves ternate, obcordate; petals obovate, entire; styles as long as the inner stamens. 4-10 i. Sandy fields. Flowers small, 4-6 in an umbel.

cornicula′ta, (lady's wood-sorrel, y. M. ☉.) pubescent; stem prostrate; umbels as long as the petioles; petals obovate, slightly emarginate; styles as long as the interior stamens; leaves ternate, obcordate.

OXYCOC″CUS. 8—1. (*Ericeæ.*) [From *oxus*, sour, and *coccus*, a berry.]

macrocar″pus, (cranberry, r. J. ♄.) creeping; stem ascending; leaves oblong, flattish, obtuse, becoming white beneath; pedicels elongated; divisions of the corolla lance-linear; berry large, bright scarlet. Wet grounds.

palus″tris, (J. ♄.) divisions of the corolla ovate; berries purple, smaller than the preceding. Alpine bogs.

erythrocar″pus, (J. ♄.) erect; leaves oval, acuminate, serrulate, and ciliate; pedicels axillary; corolla long, at last revolute, very bright scarlet, transparent, of exquisite flavor. A small shrub. *S.*

OXY′RIA. 6—2. (*Polygoneæ.*) [From *oxus*, acid, alluding to the leaves.]

renifor″mis, (J. ♃.) outer sepals oblong, half the length of the inner obovate valves; radical leaves reniform, long-petioled; stamens 2; styles 2. 2-3 i

OXYTRO′PIS. 16—10. (*Leguminosæ.*)

lamber″ti, (p. Ju. ♃.) stemless, silky-pilose; leafets numerous, oblong, acute at each end; scape about equal to the leaves; spikes oblong, capitate; bracts lance-linear, about equal to the calyx.

uralen″sis, (r-w.) stemless, villose, or silky; leafets lance-oblong; scapes longer than the leaves, scape and calyx hirsute-woolly; small heads many-flowered, ovate; flowers spreading; lower bracts longer than the calyx.

campes″tris, (y.) stemless; leafets many-paired, lanceolate, silky; scape often decumbent, sub-equal to the leaves; spikes capitate or elongated; bracts a little shorter than the calyx; legumes erect, ovate, inflated, pubescent; flowers erect.

PACHYSAN″DRA. 19—4. (*Euphorbiæ.*) [From *pachus*, thick, clumsy, and *aner* (andros), stamen.]

procum″bens, (g-w. J. ♃.) stem procumbent; leaves short, oval, crenate-toothed above; calyx minute-ciliate; capsule finely pubescent. *S.*

PÆO′NIA. 12—3. (*Papaveraceæ.*) [From *Pæon*, who is said to have first applied it to medicinal purposes.]

officina′lis, (peony, r. J. ♃.) leaves decompound; leafets lobed, lobes broad-lanceolate; capsules downy. Ex.

brown″ii, (r-p. J. Ju.) carpels 5, oblong, very glabrous, erect; leaves smooth on both sides, somewhat glaucous, biternate; leafets ternately divided or pinnatifid, laciniate; lacinia oblong, those of the lower leaves obtuse.

califor″nica, (Mar. A. r.) carpels 3, glabrous; leaves smooth on both sides, ternate leafets broadly cuneate, nearly twice 3-cleft; lacinia oblong-lanceolate, acute. Upper California.

PA′NAX. 5—2. (*Araliæ.*) [From *pan*, all, and *akos*, medicine, on account of its great virtues.]

quinquefo′lia, (ginseng, w. M. ♃.) root fusiform; leaves ternate, or quinate; leafets oval, acuminate, petioled-serrate. 1-2 f.

trifo′lium, (dwarf ginseng,) root tuberous, roundish; stem simple, smooth; leaves ternate; leafets sub-sessile, lance-oblong, serrate; styles often 3; berry 3-seeded. Woods. 4-6 i.

hor″ridum, fruticose, somewhat creeping, aculeate; leaves palmate-lobed, gash-serrate; umbels capitate, racemed; 2 styles, 2 seeds. 10-12 f.

PANCRA′TIUM. 6—1. (*Narcissi.*) [From *pan*, all, and *krateo*, to conquer; supposed by the ancients to have been a powerful medicine.]

mexica′num, (w. M. ♃.) spatha about 2-flowered; leaves lance-oblong; 6 teeth of the nectary bearing stamens, 6 simple. 18-24 i. *S.*

mariti′mum, (w. Ja. ♃.) spatha many flowered; leaves linear-lanceolate; nectary funnel-form, with 12 teeth not bearing stamens. 12-18 i. *S.*

rota′tum, (w. Ju. ♃.) spatha many-flowered; leaves linear-lanceolate; nectary salver-form, tubular below, with 6 stamens bearing teeth, intermediate one gash-toothed; stamens twice as long as the nectary. Splendid lily-like bulbous plants. *S*

PANICUM. 3—2. (*Gramineæ.*)

crus-gal″li, (barn-grass, Au. ☉.) racemes alternate and in pairs; compound rachis 5-angled; glumes terminating in hispid bristles; sheath glabrous. 2-4 f.

his″pidum, (S. Oc. ☉.) panicle compound; nodding racemes alternate; glumes terminating in hispid bristles; sheaths hispid. Salt marshes. 3-4 f.

clandesti′num, (Au. ♃.) culm with short axillary branches; leaves broad-lanceolate, cordate at base; sheaths hispid, enclosing the short panicle; abortive floret neutral, 2-valved, upper valve obtuse. Moist woods. 2-3 f.

latifo′lium, (Ju. ♃.) culm mostly simple, bearded at the joints; leaves oblong-lanceolate, smooth, or with the sheaths somewhat pubescent; panicle terminal, a little exsert, simple, pubescent; spikelets oblong-ovate; abortive floret antheriferous, 2 valved. 1 f.

pubes″cens, (J. ♃.) erect, much branched, leafy, softly pubescent; leaves lanceolate, ciliate; panicle small, few-flowered, free; spikelets sub-globose, ovate, pubescent. 18 i.

dichot″omum, (Au. ♃.) culm much branched, dichotomous above; branches fasciculate; leaves numerous, lanceolate, smooth; panicle simple, capillary, lax; abortive floret neutral; upper valve minute, bifid. Var. *curva′tum,* culm very tall; branches few, somewhat curved. Var. *fascicula′tum,* culm low, erect, or decumbent; branches and leaves dense-fascicled; panicles small, concealed among the leaves. Var. *gra′cili,* culm tall, slender; leaves membranaceous. 8-16 i.

ni′tidum, (panic grass, Ju. ♃.) culm slender, simple, smooth; sheaths bearded at the throat; leaves few, broad-linear; panicle capillary, rather crowded, compound, remote, smooth; spikelets minute, obtuse, ovate, slightly pubescent; lower glume very small. Var. *cilia′tum,* culm hairy; leaves linear-lanceolate (lower ones broader), sparingly hirsute, ciliate on the margin; panicle with the branches and flowers pubescent. Var. *ramulo′sum,* culm more branched; panicle contracted; branches smooth. Var. *pilo′sum,* culm very hairy; lower leaves approximate and broad-lanceolate, upper ones linear, rather rigid, subpilose above, ciliate at base; sheaths vilose, minutely papillose; panicle sub-contracted; branches virgate; flowers pubescent. Var. *gla′brum,* smooth except the base of the leaves, nearly simple; lower leaves short, approximate, sub-cartilaginous; panicle branched, almost verticillate; spikelets large; upper valve of the abortive floret entire. Var. *barba′tum,* culm simple, smooth; nodes hairy; leaves linear-lanceolate; sheaths smooth, except on the margin; flowers minutely pubescent. 1-2 f.

agrost″oi′des, (Au. ♃.) culm compressed, smooth, erect; leaves very long; panicles lateral and terminal, pyramidal, spreading; branches bearing racemes; spikelets appressed; abortive floret neutral; valves nearly equal. 2-3 f.

virga′tum, (Au. ♃.) whole plant very smooth; panicle diffuse, very large; flowers acuminate; abortive floret nearly equal 3-4 f.

capilla′re, (S. ☉.) culm nearly simple; sheaths very hairy; panicle large, capillary expanding, loose; spikelets long-peduncled, acuminate, smooth; abortive floret 1-valved. Var. *sylvat″icum,* culm branched at the base, very slender; leaves linear. 1-2 f.

fus″co-ru′bens, (Au.) racemes linear, virgate; glumes clavate, colored, hairy under the divisions of the panicle. *S.*

ama′rum, (Oc. ♃.) very glabrous; leaves thick, glaucous, very bitter; panicle appressed; glumes acuminate. 2-3 f. *S.*

angustifo′lium, panicle few-flowered, expanding; leaves scattered, linear-lanceolate, glabrous beneath, sparingly ciliate. 1-3 f. *S.*

PAPA′VER. 12—1. (*Papaveraceæ.*) [From *pappa*, pap, so called because nurses mixed this plant in children's food to make them sleep.]

somnif″erum, (opium poppy, J. ☉.) calyx and capsule glabrous; leaves clasping, gashed, glaucous. Ex.

rhe′as, (red corn-poppy, r. J. ☉.) capsules glabrous, sub-globose; stems many-flowered, pilose; leaves gash-pinnatifid. Ex.

nudicau′le, (y. ♂.) capsule hispid; scape 1-flowered, naked, hispid; leaves sub-pinnate; leafets lanceolate, lower ones somewhat gashed.

bractea′ta, (r. J.) capsules smooth; stem 1-flowered, rough; leaves scabrous, pinnate, serrate; flowers subtended by leafy bracts. 3 f. Ex.

du′bium, (r. w Au. ☉.) leaves pseudo-pinnate; segments lance-oblong, pinnatifid, incised, sessile, decurrent; stem with spreading hairs; peduncles with appressed bristly hairs; capsules obovoid-oblong, smooth. Naturalized in Chester co., Pa. 1-2 f.

PARIETA′RIA. 19—4. (*Urticeæ.*) [From a Latin word signifying wall, from its growing on old ruins.]

pennsylva′nica, (pallitory J. ☉.) leaves lance-oblong, veiny, opake, dotted; involucrum 3-leaved, longer than the flower. 12-15 i.

florida′na, (J.) leaves ovate, nearly round, obtuse, opake, dotted; flowers clustering as long as the involucrum; stem assurgent. 12-18 i. *S.*

PARME′LIA. 21—5. (*Algæ.*) [From *parme* shield, and *eilo*, to enclose.]

capera′ta, (shield lichen,) frond orbicular, pale yellow, becoming green, rugose, at length granulated, dark and hispid beneath; lobes plicate, sinuate-laciniate, roundish, somewhat entire; receptacles scattered; margin incurved, entire, at length pulverulent. On old timber, &c.

PARNAS″SIA. 5—4. (*Saxifragæ.*) [From Mount Parnassus, the seat of the Muses.]

america′na, (flowering plantain, w. y. p Ju. ♃.) leaves radical, (often a leaf on the scape,) heart orbicular, 5-9 nerved; nectaries 5, each divided into 3 filaments termi nated by little spherical heads. Damp or wet. 6-18 i.

palus″tris, leaves all cordate, cauline ones sessile; scale smooth, many-bristled; flowers white, with veins of green or purple. Bog meadows.

parviflo'ra, very slender, with slender, bristly scales, about 5; radical leaves ovate, tapering into the petiole; cauline ones linear, oblong-sessile.

fimbria'ta, scales broad, wedge-form, fleshy, crenate in the middle, within keeled, naked; radical leaves long-petioled, ear kidney-form; cauline ones cordate, sessile, inserted much above the middle; petals fringed at the base.

asarifo'lia, (Ju. Au. ♃.) radical leaves reniform; petals clawed; nectaries 3-cleft. *S.*

PARTHE'NIUM. 17—4. (*Corymbiferæ.*)

integrifo'lium, (w. S. ♃.) leaves oblong, unequally-toothed, rough; upper ones clasping. 1-2 f.

PAS″PALUM. 3—2. (*Gramineæ.*) [From *paspalos*, millet, which this plant resembles in its seeds.]

ciliatifo'lium, (S. ♃.) stem decumbent; leaves hairy, ciliate; spikes 1-2, indistinctly 3-rowed. 18 i.

seta'ceum, (paspalon-grass, ♃.) culm erect; leaves and sheaths villose; spike generally solitary; flowers in 2 rows. Sandy fields. 1-2 f.

de'bile, stem weak; leaves and stem hairy; spike generally one, slender; flowers alternate, 1-rowed. *S.*

florida'num, (J. S.) erect; lower leaves very villose; upper ones scabrous, hairy; sheaths long; spikes few; flowers in 2 rows, glabrous, large. 3-4 f.

præ'cox, (J.) erect; leaves lanceolate-linear, glabrous; spikes many, alternate; rachis narrow, hairy at base; flowers 3-rowed. Damp soil. *S.*

dis″tichum, (creeping paspalum, joint-grass, ♃.) stem creeping; leaves short, somewhat glaucous, shining; spikes 2, one sessile; glumes lanceolate. *S.*

PASSIFLO'RA. 15—5. (*Cucurbitaceæ.*) [The term *flos passionis*, or passion-flower, was before the time of Linnæus, applied to this beautiful genus, because the instruments of Christ's passion were thought to be represented by the parts of the flower.]

cæru'lea, (blue passion-flower, b. Ju. ♄.) leaves palmate, 5-parted, entire; petioles glandular; involucrum 5-leaved, entire; threads of the crown shorter than the corolla. Ex.

lute'a, (yellow passion-flower, y. S. ♃.) leaves cordate, 3-lobed, obtuse, nearly smooth; petioles without glands; peduncles axillary, in pairs; petals much longer than the calyx; stem climbing and slender. Banks of streams.

incarna'ta, (w. p. Sept. ♃.) leaves smooth; petioles with 2 glands; involucrum 3-leaved; leafets lanceolate, glandular-serrate; stem long, climbing; petals white; nectary purple, longer than the corolla; fruit sub-acid and spongy, eatable.

ala'ta, (winged passion-flower, Oct. ♄.) leaves oblong-ovate, sub-cordate, entire, veiny; petioles with 4 glands; stipules lance-falcate; stem 4-cornered. Ex.

pelta'ta, (♄.) leaves peltate, deeply 3-lobed, glabrous; lobes lance-linear; petioles with 2 glands; peduncles solitary, axillary petals 0. *S.*

wa'rei, (♃.) lower leaves 3-lobed, acute upper ones undivided, ovate; petioles with 2 glands; peduncles somewhat in pairs. 4-6 i. *S.* Cer.*lou'doni*, flowers of a most brilliant crimson. Ex.

PASTINA'CA. 5—2. (*Umbelliferæ.*) [From *pasco*, to feed.]

sati'va, (parsnip, y. Au. ♂.) leaves simply pinnate; leafets glabrous. Var.*arven″sis*, leafets sub-pubescent. This variety is often found in situations which almost prove it to be indigenous.

PEC″TIS. 17—2. (*Corymbiferæ.*)

angustifo'lius, (y. ☉.) stem branching at the base, diffuse; leaves narrow-linear, mucronate, denticulate at the base; teeth terminating in hairs; flowers terminal, solitary, short peduncled; involucrum 8-leaved; chaff short, 5-toothed. 1-2 i.

PEDICULA'RIS. 13—2. (*Pediculares.*) [From *pediculus*, a louse.]

canaden″sis, (louse-wort, y-p. M. ♃.) stem simple; leaves pinnatifid, gash-toothed; heads leafy at the base, hirsute; corolla with a setaceous, 2-toothed upper lip, calyx obliquely truncate. 6-12 i.

pal″lida, (y. Ju. ♃.) stem smooth, branched; leaves sub-opposite, lanceolate, pinnatifid, toothed and crenate, scabrous on the margin; helmet of the corolla truncated at the apex; calyx bifid, with roundish segments. 1-2 f.

resupina'ta, (p. Ju. ♃.) stem simple, glabrous; leaves lanceolate, toothed, crenate; calyx bifid-truncate; upper lip of the corol acute. Canada.

hirsu'ta, (r. ♃.) stem simple; leaves pinnate; leafets lanceolate, obtusely-toothed; calyx hirsute, 5-cleft; upper lip of the corolla very obtuse.

ela'ta, (p. Ju. ♃.) stem simple; leaves deeply pinnatifid; divisions lance-linear, crenate; spike lax, somewhat leafy; calyx glabrous, 5-toothed; upper lip of the corolla obtuse, truncate. 2 f.

gladia'ta, (y-p. J. ♃.) stem simple; leaves lanceolate, pinnatifid, toothed; spikes leafy, hairy; flowers alternate; capsule terminating in a long, flat point. 1 f.

PELARGO'NIUM. 15—7. (*Gerania.*) [From *pelargos*, a stork, on account of the shape of the pericarp, which resembles a stork's bill.]

A. *Nearly stemless; roots tuberous.*

tris″te, (mourning geranium,) umbel simple; leaves rough-haired, pinnate; leafets bi-pinnatifid; divisions oblong-acute, flowers dark green.

daucifo'lium, (carrot geranium, ♃.) scape very simple; leaves thrice pinnate, hirsute leafets lance-linear.

B. *Leaves simple, not angled.*

odoratis″simum, (sweet-scented geraniam, ♄.) peduncles sub-5-flowered; leaves round-cordate, very soft.

C. *Leaves simple, more or less angled, or lobed.*

zona'le, (horse-shoe geranium, ♄.) umbels many-flowered; leaves heart-orbicular, obsoletely-lobed, toothed, with a colored zone around or near the margin.

in'quinans, (scarlet geranium, ♄.) umbels many-flowered; leaves round-reniform, hardly divided, crenate, viscid-downy.

acerifo'lium, (lemon or maple-leaf geranium, ♄.) umbels about 5-flowered; leaves 5-lobe-palmate, serrate; below wedge-form, undivided.

capita'tum, (rose-scented geranium, ♄.) flowers capitate; leaves cordate, lobed, waved, soft; stem diffuse.

quercifo'lium, (oak-leaf geranium, ♄.) umbels sub-many-flowered; leaves cordate, pinnatifid, crenate; sinuses rounded; filaments ascending at the apex.

grave'olens, (sweet-rose geranium, ♄.) umbels many-flowered, sub-capitate; leaves palmate, 5-lobed; divisions oblong, obtuse; margins revolute.

PENNISE'TUM. 3—2. (*Gramineæ.*) [*Penna,* a feather, and *seta,* a bristle, from the feathery appearance of the involucre.]

glau'cum, (fox-tail panic, J. ☉.) perfect floret transversely rugose; involucre of many fascicled bristles, scabrous upwards; spike cylindrical. Var. *purpuras''cens,* sheaths hairy; glumes and bristles of the involucre hairy. Introduced. 2 f.

pun''gens, (♃.) spike terete, strict; involucre many-parted, 1-flowered; segments terete, subulate, rigid, scabrous, a little longer than the florets. *S.*

PENTHO'RUM. 10—5. (*Sempervivæ.*)

sedoi'des, (Virginian orpine, g-y. Ju. ♃.) stem branching, angled; leaves lanceolate, sub-sessile, unequally and densely serrate; spikes secund, terminal, panicled, alternate and cymed; seeds pitted. 12-18 i. *S.*

PENTSTE'MON. 13—2. (*Bignoneæ.*) [From *pente,* five, and *stema,* stamen. This plant, though it is placed in the class Didynamia, has the rudiment of a fifth stamen; from hence its name.]

pubes''cens, (beard-tongue, w-p. J. ♃.) stem hairy; leaves serrulate, lance-oblong, sessile; flowers panicled; the barren filament bearded from the apex to below the middle. Var. *latifo'lia,* has broad, smooth leaves. Var. *angustifo'lia,* has narrow, hairy, obscurely denticulate leaves. 1-2 f. Hill-sides.

læviga'tum, (p. J. ♃.) smooth; leaves ovate-oblong, clasping at the base, slightly toothed, the lower ones entire; flowers paniculate; sterile filament bearded near the top. 1-2 f. Low grounds.

frutes''cens, (p. ♄.) stem fruticose; branches angled, pubescent above; leaves lanceolate, obsoletely denticulate, sessile, nearly glabrous; raceme terminal, sub-corymbed; sterile filament bearded. 12-18 i.

grandiflo'rum, very glabrous; leaves half-clasping, ovate-oblong, entire; upper ones roundish; flowers solitary and axillary; sterile filament partly pubescent at the summit; segments of the calyx oblong, acute.

gra'cile, (p. J.) stem smooth, slender leaves smooth, linear, acute, half-clasping, sharp-serrulate; sterile filament bearded longitudinally; segments of the calyx linear-oblong. 12-24 i.

cæru'leum, (b. ♃.) smooth; radical leaves linear, entire; cauline ones lance-linear, entire; all sessile; sterile filament short, bearded above; segments of the calyx lanceolate, acute, glabrous. *S.*

erian''thera, (p. J. ♃.) stem and leaves glabrous; leaves sessile, lance-ovate, entire, sub-undulate at the margin; peduncles many-flowered, secund; segments of the calyx round-oval, acuminate; sterile filament slightly bearded under the retuse point; anthers pubescent. *S.*

al''bidum, (w.) low; leaves lance-ovate sub-serrulate, smooth, sessile; flowers sub-fascicled, axillary and terminal; sterile filament slenderly and interruptedly bearded segment of the calyx lance-linear, pubescent. 6-8 i. *S.*

dissec''tum, (p.) leaves opposite, sessile glabrous, compoundly dissected; segments linear and generally obtuse; flowers in panicles; stigma simple. 2 f. *S.*

campanula'tus, produces light purple flowers, from Mar. to Oc. 18 i. Ex.

ro'seus, has red flowers. Ex.

murraya'nus, the most beautiful species; grows about two feet high, and produces brilliant scarlet flowers in August. Ex.

PERIPLO'CA. 18—5. (*Apocyneæ.*) [From *peri,* about, and *ploke,* twining.]

græ'ca, (milk-vine, p. m. ♄.) climbing; leaves opposite, ovate, acuminate; flowers hairy within, and terminal. A native of the Canary Isles.

PETALOS''TEMON. 16—8 (*Leguminosæ.*) [From *petalon,* a petal, and *stema,* a stamen, the petals and stamens united form a tube.

can''didum, (w. Ju. ♃.) spike cylindric, peduncled; bracts longer than the flower; calyx glabrous; leaves lanceolate, in 3 pairs.

viola'ceum, (r-p. Au. ♃.) bracts about equal to the calyx; little bracts spatulate, caducous; calyx silky; leaves linear, in 2 pairs.

villo'sum, (r. Au. ♃.) villous; stem decumbent; spike large, cylindric, sub-sessile; bracts shorter than the woolly, 5-toothed calyx; leafets linear-oblong, about 7 pairs.

carne'um, (w. Ju. ♃.) spike cylindric, pedunculate; bracts subulate, as long as the glabrous calyx; leafets lanceolate, entire, small. 2-3 f. *S.*

corymbo'sum, (w. S. ♃.) peduncles in panicled corymbs; calyx plumose; leafets linear, unawned, glabrous. 2 f. Dry sandy pine barrens. *S.*

PEUCEDA'NUM. 5—2. (*Umbelliferæ.*) [From *peuke,* fir, which its leaves resemble, and *aanos*, dry or burning, alluding to the qualities of the root.]

terna'tum, (sulphur-wort, ♃.) leaves ternate, long-petioled; leafets entire, long-linear, acute, alternated below; involucrum nearly wanting; involucel very short, 5-6-leaved; fruit oblong-oval. 3 f. *S.*

PHA'CA. 16—10. (*Leguminosæ.*) [A Greek word signifying lentil.]

villo'sa, (y. Ju. ♃.) nearly stemless, villose; leafets oval, glabrous above; peduncles as long as the leaves; legumes hoary; villose, oblong.

tri-phyl''la, (♃.) stemless, assurgent; leaves ternate; leafets lanceolate, sessile; scape none; legumes sessile, oblong. Leaves of silvery hue. *S.*

PHACE'LIA. 5—1. (*Boragineæ.*) [From *phakelos*, bundle, alluding to the fascicled spikes.]

bipinnat''ifi'da, (b. M.) erect; leaves pinnatifid; segments incisely lobed; racemes mostly bifid, oblong, many-flowered; divisions of the corolla entire. 6 f.

fimbria'ta, (b. M. ☉.) leaves pinnatifid, the lobes undivided; segments of the corolla fimbriate. 6-12 i.

parviflo'ra, (b. M. ☉.) stem diffuse, pubescent; leaves sub-sessile, pinnatifid; segments oblong, rather obtuse, entire; racemes solitary; pedicels short; segments of the corolla round, very entire. 6-8 i.

integrifo'lia, erect, pubescent; leaves petioled, ovate, crenate-serrate; racemes numerous, dense-flowered.

heterophyl''la, (b. Ju. ♂.) erect, hispid; leaves petioled, pinnatifid; divisions lanceolate, entire, nerved, terminal one elongated; floral leaves simple, lanceolate, petioled; racemes 2-cleft, dense-flowered; divisions of the corolla entire. *S.*

PHALAN''GIUM. 6—1. (*Asphodeli.*) [From *phalagx*, tarantula, whose bite it was supposed to cure.]

esculen''tum, (b. M. ♃.) root bulbous; leaves all radical, linear, connate; stigma minutely 3-cleft. 12-18 i.

cro'ceum, (y. ♃.) root bulbous; scape much longer than the grass-like leaves; spike pyramidal; bracts short; seed sub-globose, smooth. *S.*

PHALA'RIS. 3—2. (*Gramineæ.*) [From *phalos*, shining, so named from the appearance of its seed.]

america'na, (riband-grass, wild canary-grass, Ju. ♃.) panicle oblong, spiked; glumes of the calyx boat-shaped, serrulate; corolla unequal; rudiments hairy. Var. *pic''ta*, leaves variously striped. This variety is the riband grass of the gardens. 2-5 f

canarien''sis, (canary-grass, Ju. ☉.) panicle sub-spiked, ovate; glumes boat-form, entire at the apex; rudiments smooth. Introduced. 18 i.

PHASEO'LUS. 16—10. (*Leguminosæ.*) [From *phaselos*, a little boat, which its pods were thought to resemble.]

peren''nis, (wild kidney-bean, p. Ju. ♃.) twining, pubescent; leafets ovate, acuminate, 3-nerved; racemes 1-3, axillary, paniculate, longer than the leaves; bracts minute; legumes pendulous, broad, falcate, mucronate; flowers large. Dry woods.

luna'tus, (Carolina bean, Lima bean, g-w Ju. ☉.) twining; legumes cimeter-form, sub-lunate, smooth; seeds compressed. Ex.

vulga'ris, (common pole-bean, p. w. Ju. ☉.) stem twining; racemes solitary, shorter than the leaves; peduncles in pairs; bracts smaller than the calyx, spreading; legumes pendulous. From the East Indies.

na'nus, (bush-bean, six-weeks-bean, ☉.) stem erect, smooth; bracts larger than the calyx; legumes pendulous, compressed rugose; seeds variously colored. Ex.

multiflo'rus, (scarlet runner, r. w. Ju. ☉.) twining, sub-glabrous; leafets ovate, acuminate; racemes peduncled, longer than the leaves; peduncles in pairs; bracts close-pressed, shorter than the calyx legumes sub-scabrous. South America.

PHILADEL''PHUS. 11—1. (*Myrti.*) [From *phileo*, to love, *adelphos*, a brother. This name was first given to the Galium or bed straw, because by its roughness it attached itself to what was near.]

inodo'rus, (scentless syringa, w. J. ♄.) leaves acuminate, oval, entire; divisions of the calyx acute; style undivided, longer than the stamens; stigmas 4, oblong; flowers large. *S.*

corona'rius, (mock-orange, false syringa w. J. ♄.) styles distinct; leaves ovate, subdentate. Ex.

grandiflo'rus, (w. M. ♄.) leaves short petioled, opposite, ovate, acuminate, denticulate, a little hairy; segments of the calyx acuminate; style undivided, longer than the stamens; stigmas 4, linear. Cultivated. *S.*

hirsu'tus, (w. ♄.) leaves oblong-ovate acute, sharply angular-denticulate, hirsute above, whitish-villose beneath; style and stigma undivided; peduncles 2-bracted near the summit. *S.*

PHILOX''ERUS. 15—5. (*Amaranthi.*) [From *philos*, love, and *xeros*, dry or burnt; alluding to the kind of soil in which it is found.

vermic''ularis, (J. ♃.) glabrous; stem creeping; leaves sub-terete, fleshy; flowers in terminal, solitary, oblong heads. *S*

PHLE'UM. 3—2. (*Gramineæ.*)

praten''se, (timothy grass, J. ♃. and ♂.) spike cylindric, calyx mucronate-awned; keel ciliate; awn shorter than the calyx; culm erect. Introduced. 2-3 f.

alpi'num, (Au.) spike ovate or cylindric-ovate, hirsute or villose; spike often blackish or dark purple.

PHLOX 5—1. (*Polemoneæ.*) [A Greek word signifying flame, from the bright color of the flowers of some of its species.]

panicula'ta, (smooth stem lichnidia, r. w J. ♃.) glabrous, erect; leaves lanceolate, narrowing gradually, flat; margins rough, corymbs panicled; divisions of the corolla rounded; calyx awned. Cultivated. 2-3 f

macula'ta, (spotted lichnidia, r. w. Ju. ♃.) stem erect, scabrous and spotted; leaves oblong-lanceolate, smooth; panicle oblong, many-flowered; segments of the corolla rounded; teeth of the calyx acute, recurved. Var. *suave'olens,* stem without spots; corolla white. 2 f.

arista'ta, (r. w. J. ♃.) weak, erect, viscid-pubescent; leaves lance-linear; panicle lax, fastigiate; pedicels somewhat in pairs; divisions of the corollas somewhat obovate; tube curved, pubescent; teeth of the calyx long, subulate. Var. *divarica'ta,* corolla purplish blue. Var. *vi'rens,* corolla reddish purple. Var. *canes''cens,*corolla whitish rose-color. 1-2 f.

pilo'sa, (creeping lichnidia, p. w. J. ♃.) small, decumbent, pubescent; leaves linear-lanceolate, downy with the margins revolute; corymbs nearly fastigiate; teeth of the calyx subulate, acute. 12-18 i.

rep''tans, (b. p. J. ♃.) pubescent with creeping suckers; radical leaves obovate spatulate, cauline ones lance-oval; corymb spreading, few-flowered; segments of the corolla obovate; teeth of the calyx subulate, reflexed. 8-18 i.

seta'cea, (r. J. ♃.) cespitose, pubescent; leaves fascicled, subulate, pungent, ciliate; flowers few, terminal, somewhat umbelled; segments of the corolla cuneate, emarginate; teeth of the calyx subulate, much shorter than the tube of the corolla. Rocks and sandy hills.

revolu'ta, (w-p. J. ♃.) glabrous; stems erect, sub-simple; leaves coriaceous, paler beneath, sub-sessile; lower ones lance-linear, acute at each end; upper ones lanceolate, rounded at the base; corymb sub-fastigiate, few-flowered; pedicels sub-scabrous; segments of the corolla obovate, slightly crenulate; calyx glabrous; segments lanceolate, acute, unawned, half as long as the corolla. 12-18 i. Damp woods. Md.

undula'ta, (b. Au. ♃.) erect, glabrous; leaves oblong-lanceolate, slightly waved, margins scabrous; corymbs paniculate; segments of the corolla somewhat retuse; calyx awned. 2 f. *S.*

caroli'na, (p. Au. ♃.) stem pubescent; leaves ovate-lanceolate, glabrous; corymbs sub-fastigiate, branches generally 3-flowered; teeth of the calyx linear-lanceolate. *S.*

glaber''rima, (p. Ju. ♃.) erect; leaves linear-lanceolate, glabrous; corymb terminal, nearly fastigiate; teeth of the calyx linear-lanceolate, acute. 1-2 f. *S.*

specio'sa, (w. p. J. ♄.) erect, glabrous, frutescent, very branching; leaves linear; upper ones alternate, dilated at the base; racemes panicle-corymbed; segments of the corolla wedge-oblong, emarginate; teeth of the calyx subulate, equalling the tube. *S.*

ova'ta, (r-p. J. ♄.) erect, glabrous; radical leaves ovate, acute, somewhat fleshy; cauline ones lanceolate; corymbs sub-fastigiate; segments of the corolla undulate, retuse; teeth of the calyx linear, acute. *S.*

ni'tida, (p. J ♃.) erect, glabrous; stem scabrous; leaves ovate-oblong, sub-coriaceous, corymb fastigiate; segments of the corolla obovate, sub-retuse; teeth of the calyx lanceolate, mucronate. 18 24 i. *S.*

corda'ta, (Au.) erect; leaves oblong-cordate, sub-acuminate; margin scabrous; corymbs paniculate; teeth of the calyx long, awned. 1-2 f. *S.*

niva'lis, a low training perennial, producing white flowers in April and May Ex.

canaden''sis, (Ap. M.) produces blue flowers, grows nearly a foot in height. Ex.

drummond''ii, the only annual species and has many varieties.

subula'ta, (mountain-pink, r. M. ♃.) cespitose, white-pubescent; leaves linear-ciliate; corymbs 5-flowered; pedicels 3-cleft divisions of the corolla wedge-form, emarginate; teeth of the calyx subulate, scarcely shorter than the tube of the corolla. Cultivated. 3-6 i.

pyr''ami'dalis, (p. Au. ♃.) erect, smooth, stem scabrous; leaves cordate-acute; panicle fastigiate, pyramidal; segments of the corolla wedge-form, truncate; leaves opposite, sessile, very entire. Mountain meadows. 2-3 f.

PHŒNICAU'LIS. 14—2. (*Cruciferæ.*)

cheiranthoi'des, (p. ♃.) scape slender; leaves entire, densely and stellately tomentose; flowers in simple corymbose racemes; siliques diverging horizontally; scape 4 6 i. with a few small sessile and partly clasping leaves. Oregon.

PHRAGMI'TES. 3—2. (*Gramineæ.*)

commu'nis, (Au. ♃.) calyx about 5-flowered; florets longer than the calyx. 6-12 f

PHRY'MA. 13—2. (*Labiatæ.*)

leptosta'chya, (p. w. ♃.) leaves large, ovate, toothed, petioled; spikes terminal, slender; flowers opposite, small. Shady woods. 2-3 f.

PHYLLAC''TIS. 3—1. (*Dipsaceæ.*) [From *phullon,* leaf, and *ago,* to carry, from being stemless.]

obova'ta, (Oc.) stemless; root fusiform leaves radiating, linear-spatulate, obtuse, hirsute-pilose. *S.*

PHYLLAN''THUS. 19—15.(*Euphorbiæ.*) [From *phullon,* a leaf, and *anthos,* flower, because the flowers in one of the original species (since placed in another genus) grow out of the leaves.]

obova'tus, (S. ☉.) leaves alternate, oval obtuse, glabrous; flowers few, axillary pedicelled, nodding; stem erect; branches distichus.

PHYSA'LIS. 5—1. (*Solaneæ.*) [From *phusao,* to inflate, so called because its seed is contained in a kind of bladder.]

visco'sa, (yellow henbane, y. Ju. ♃.) leaves in pairs, heart-oval, repand, obtuse, sub-tomentose, a little viscous; stem herbaceous, paniculate above; fruit-bearing calyx pubescent. 2-3 f. Road-sides.

obscu'ra, (y. p. Au.) pubescent; stem prostrate, divaricate; leaves broad-cordate sub-solitary, toothed; flower solitary, nodding; calyx hairy; flower pale yellow with 5 purple spots at the base, anthers bluish. Hills.

pennsylva'nica, (y. S. ♃.) stem branched; leaves ovate, obtuse; peduncles axillary solitary, a little longer than the petioles. 1 f. Road sides.

alkeken''gi, (winter-cherry,) leaves in pairs, entire, acute, sub-ramose below. Ex.

lanceola'ta, (y. J. ♃.) erect, densely pubescent; leaves mostly in pairs, oval-lanceolate, entire, narrowed at the base into a petiole; flower solitary, nodding; calyx villose. 1-2 f.

loba'ta, (g.) leaves oblong, somewhat fleshy, lyrate-lobed, narrowed into the petiole at the base, glabrous, revolute at the margin; stem herbaceous, branching; peduncles solitary.

pubes''cens, (y. Ju. ☉.) leaves villose, viscous, slightly cordate; stem much branched; flowers solitary, pendulous; fruit-bearing calyx nearly globose, slightly angled. *S.*

somnife'ra, (y. Ju. ♃.) tomentose; leaves ovate, very entire; flowers crowded, short-pedicelled; corolla bell-form. *S.*

wal''teri, (♃.) pulverulent, sub-tomentose, very branching, dichotomous; leaves in pairs, broad-ovate, obtuse, long-petioled, entire; peduncles solitary, nodding; calyx fructiferous, somewhat glabrous. S. C.

angustifo'lia, (♃.) very glabrous, prostrate, dwarfish; leaves very long, linear, fleshy, solitary; peduncles nodding, filiform, solitary. West Florida.

PHYTOLAC''CA. 10—10. (*Atriplices.*) [From *phuton*, a plant, and *lakka*, gum-lac, on account of the color of its fruit.]

decan''dra, (poke-weed. w. Ju. ♃.) leaves ovate, acute at both ends; flowers racemed; berries flattened at the ends. 3-6 f.

PICKERIN''GA. 5—1. (*Ericæ.*)

panicula'ta, (♄.) evergreen; leaves entire, alternate, wedge-oblong, obtuse; flowers panicled. *S.*

PINCKNEY'A. 5—1. (*Rubiace*[illegible] [In honor of Gen. C. C. Pinckney, o[illegible]

pu'bens, (p. J. ♄.) leaves opposite, lanceolate, entire, thinly pilose and shining above; tomentose below, sub-acuminate; calyx superior, persistent, colored. 15-20 f. *S.*

PINGUIC''ULA. 2—1. (*Scrophulariæ.*) [From *pinguis*, fat, so called because its leaves are greasy to the touch.]

vulga'ris, (butter-wort, M. ♃.) spur cylindrical, acute, as long as the veinless petal; upper lip 2-lobed, lower one in 3 obtuse segments; leaves radical, spatulate ovate, fleshy; flowers solitary, nodding; tube of the corolla villose, purple. Wet rocks. Rochester, N.Y. Canada.

lute'a, border of the corolla 5-cleft; spur subulate, a little shorter than the tube. 6-8 i. Flowers yellow. *S.*

pu'mila, (b. Ap. ♃.) border of the corolla 5-cleft; segments emarginate; lobes entire; spur subulate, a little obtuse, as long as the tube. 3-5 i. *S.*

acutifo'lia, (Ju. ♃.) very glabrous; leaves erect, oval, very acute. *S.*

austra'lis, (r.) glabrous; nectary very short, incurved; flowers rather large. West Florida

PI'NUS. 19—15.

A. *Leaves solitary, with separate bases.*

canaden''sis, (hemlock-tree, M. ♄.) leaves flat, denticulate, 2-ranked; strobiles ovate, terminal, scarcely longer than the leaves. The bark is used in tanning leather.

balsa'mea, (American silver-fir, balsam fir, M. ♄.) leaves solitary, flat, glaucous beneath, somewhat pectinate at the summit; strobile cylindrical, erect. 40-50 f.

frase'ri, (J. ♄.) leaves short, emarginate, subsecund, erect above; cones ovate-oblong; bracts elongated, incisely denticulate.

taxifo'lia, (♄.) leaves solitary, flat, subdistichus; cones oblong; anthers didymous.

ni'gra, (M. ♄.) leaves solitary, 4-angled, scattered on all sides, erect, straight; cones ovate, scales elliptic, undulate along the margin, the summit denticulate.

al''ba, (M. ♄.) leaves 4-sided, incurved; strobiles sub-cylindric, lax; scales obovate, entire.

ru'bra, (M. ♄.) leaves solitary, subulate, strobiles oblong, obtuse; scales rounded, somewhat 2-lobed, entire on the margin.

B. *Leaves many, sheathed at the base.*

[*Leaves in pairs.*]

resino'sa, (yellow-pine, Norway-pine, red-pine, M. ♄.) leaves and sheath elongated; strobiles ovate-conic, rounded at the base, sub-solitary, about half as long as the leaves; scales dilated in the middle, unarmed. Bark of a reddish color, and much smoother than the pitch-pine, or white-pine. Often grows very tall and straight.

in''ops, (M. ♄.) leaves short, strobile recurved, oblong-conic, as long as the leaves spines of the scales subulate, straight.

banksia'na, (scrub-pine, M. ♄.) leaves short, in pairs, rigid, divaricate, oblique; strobiles recurved, twisted; scales unarmed. Rocky grounds.

[*Leaves in threes.*]

rig''ida, (pitch-pine, M. ♄.) leaves with abbreviated sheaths; staminate aments erect-incumbent; strobiles ovate, scattered or aggregated; spines of the scale reflexed. Though very common, it grows most plentifully on barren, sandy plains.

varia'bilis, (yellow-pine, M. ♄.) leaves elongated, in pairs and threes, channelled; strobile ovate-conic, mostly solitary; spines of the scales incurved.

[*Leaves in fives.*]

stro'bus, (white-pine, M. ♄.) leaves in fives, slender; sheaths very short; strobile pendulous, cylindrical, longer than the leaves; scales loose. Timber soft-fine-grained and light. Extensively used. Sometimes 140 f.

C. *Leaves many, in a fascicle.*

pen''dula, (black larch, tamarack, hackmatack, M. ♄.) leaves deciduous; strobiles oblong; margins of the scale inflexed; bract guitar-form, with a slender point.

flex''ilis, leaves in fives, short, and rather rigid; sheaths short and lacerate; strobile erect; scales large, unarmed; branches very flexible.

la'rix, (common larch, ♄.) leaves deciduous; strobiles ovate-oblong; margins of the scales reflexed, lacerate; bracts guitar-form. Ex.

pun''gens, (table mountain pine, ♄.) leaves by pairs, short, acute; cones ovate-conical, spines of the scales long, subulate, incurved, lower ones reflexed. 40-50 f. *S.*

tæ'da, (M. ♄.) leaves long, by threes; sheaths long; strobiles oblong-conic, deflexed, shorter than the leaves; spines inflexed. Var. *heterophyl''la,* leaves in pairs and threes; bark smooth.

palus''tris, (long-leaved, yellow, or pitch-pine, M. ♄.) leaves by threes, very long; stipules pinnatifid, ramentaceous, persistent; strobiles subcylindric, muricate. Timber, extensively used in the Southern States.

PI'PER 2—3. (*Urticeæ.*) [Originally *pippul,* in the Bengalese tongue.]

leposta'chyon, (Florida pepper, ⊙.) herbaceous, small, leaves obovate, obtuse, sub-3-nerved, pubescent; spikes axillary, filiform, erect, much longer than the leaves. 6-12 i. *S.*

PIPTATHE'RUM. 3—2. (*Gramineæ.*) [From *pipto,* to fall, and *theios,* harvest, summer.]

racemo'sum, or *nigrum,* (clustered or black seed millet grass, Au. ♃.) panicle simple; flowers racemose, ovate-lanceolate; corolla black, hairy; awn as long again as the glume.

PIS''TIA. 15—8. (*Gerania.*)

spathula'ta, (w. Ju.) leaves abruptly narrowed into the petiole, dilated, round and obtuse toward the summit. *S.*

PI'SUM. 16—10. (*Leguminosæ.*)

sati'vum, (pea, p. w. J. ⊙.) petioles terete; stipules round and crenate at the base; peduncles many-flowered. Var. *umbella'tum,* (bouquet-pea,) has the stipules 4-cleft, acute. Var. *quadra'tum,* (quadrate pea,) fruit ash-color, 4-sided. Var. *hu'mile,* (dwarf pea,) stem erect, not climbing; leafets roundish. Ex.

PITCH''ERIA. 16—10. (*Leguminosæ.*) [In honor of Dr. Pitcher of U. S. A.]

galactoi'des, (r. ♃.) stem erect, rigid, branched, smooth; leaves trifoliate, oval, obtuse, glandular-dotted beneath. *S.* Florida.

PLANE'RA. 5—2. (*Amentaceæ.*)

aquat''ica, (M. ♄.) leaves ovate, acute, serrate, equal at the base, slightly scabrous, short-petioled. 25-30 f. *S.*

PLANTA'GO. 4—1. (*Plantaginea.*) [From *planta,* the sole of the foot, so called because its leaves are trodden under foot.]

ma'jor, (plantain, w. J. ♃.) leaves ovate, sub-dentate, sub-glabrous; scape terete; spike oblong, imbricate. 6-24 i.

lanceola'ta, (English plantain, ripple grass, J. ♃.) leaves lanceolate; spike short, ovate-cylindrical; scape angular; capsule 2-seeded. 1-2 f.

virgin''ica, (dwarf plantain, r-y. J. ⊙.) hoary-pubescent; leaves lanceolate-ovate, sub-denticulate; spikes cylindric, with remote flowers; scape angular; cap 2-seeded.

corda'ta, (w. J. ♃.) leaves ovate, cordate, broad, sub-dentate, smooth; spike very long; flowers sub-imbricate, lower ones scattered; bracts ovate, obtuse; cells of the capsule 2-seeded. 12-18 i.

me'dia, (w. J. ♃.) leaves ovate, pubescent, short-petioled; scape terete; spike short, cylindric; cells 1-seeded. One variety has the leaves hirsute and the spikes branching.

mariti'ma, (sea plantain, Au. ♃.) leaves linear, grooved, fleshy, hairy near the base, scape round, terete; spike cylindric; bracts acutish. 6-10 i.

pusil''la, (Au. ⊙.) minutely pubescent; leaves linear-subulate, flat, entire, acute, scape terete, longer than the leaves; spike cylindric, loose; lower flowers distant; bracts ovate, acute, as long as the calyx.

cuculla'ta, (Ju. ♃.) leaves ovate-cucullate, sub-denticulate, 9-nerved, pubescent beneath; spike cylindric, imbricate; scape terete.

eriopo'da, (♃.) stemless petioles covered with long wool at the base; leaves broad-lanceolate, alternate at each end, long-petioled, glabrous, entire, 5-nerved; scape terete, glabrous, spike cylindric; flowers remote; stamens and styles long; bracts broad-ovate, obtusish; capsules 2-seeded 9-12 i.

interrup''ta, (Ju. ♃.) leaves lanceolate entire, hairy; spike long, slender, interrupted; flowers scattered, glabrous. *S.*

gla'bra, leaves ovate, denticulate, smooth scape slender, sub-compressed, nearly equal to the leaves; flowers scattered; bracts ovate, acuminate. *S.*

gnaphaloi'des, (Ju. ⊙.) silky-villose; leaves lance-linear, very entire; scape terete, scarcely longer than the leaves; spike cylindric, intricate; bracts linear, with long villose ciliæ. *S.*

PLATAN''THERA. 18—1. (*Orchideæ.*) [From *platys,* broad, *anthe'ra,* anther, from the width of that organ.]

orbicula'ta, (g-w. J. ♃.) leaves 2, radical, orbicular; scape with 2 or 3 bract-like leaves, many-flowered; bracts shorter than the flowers; lip lance-linear, obtuse; spur longer than the ovary. 12-18 i.

dilata'ta, (giant orchis, w. or g. J. ♃.) spur shorter than the germ; lip entire, linear, with the base dilated of the length of the spur; bracts of the length of the flower On mountains the flowers are green, in the meadows white. 1-4 f.

PLATA'NUS, 19—13. (*Amentaceæ.*) [From *plata,* broad, alluding to the size of the tree]

occident''alis, (buttonwood, American plane-tree, false sycamore, J. ♄.) leaves 5-angular, obsoletely lobed, toothed, pubescent beneath; stem and branches becoming white. One of the largest trees in North America.

PLATYS''TEMON. 12—12. (*Papaveraceæ.*) [From *platus,* broad, *stemon,* strand or filament.]

califor''nicum, (y-w. ⊙. leaves half clasping, oblong, linear, obtuse, entire, alternate, 3-5-nerved; peduncles axillary, elongated 1-flowered; plant sparsely covered with shaggy, spreading hairs. California

PLATYSPET″ALUM. 14—1. (*Cruciferæ.*) [From *platus*, broad, *petalon*, leaf.]

purpuras″cens, stigma 2-lobed spreading; style manifest; scape naked, 1-leaved, and pubescent; silicles sub-glabrous.

du′bium, stigma undivided, sub-sessile; silicles and scapes pubescent.

PLATYSPER″MUM. 14—1. (*Cruciferæ.*) [From *platus*, broad, *sperma*, seed.]

scapige′rum, (w. Mar. Ap. ⊙.) root sub-fusiform, scarcely fibrous; leaves all radical, spreading, sub-runcinate-pinnatifid; lobes mostly acute; lower ones gradually smaller, attenuated into a petiole; scapes digitate, erect, simple, very glabrous, 1-flowered; flowers small, erect.

PLECTRI′TIS. 3—1. (*Dipsaceæ.*) [From *plektron*, a spur, alluding to the form of the corolla.]

conges″ta, (r. ⊙.) glabrous; flowers in a dense whorl; bracts many-cleft, in subulate divisions. Var. *mi′nor*, leaves very narrow.

PLEE′A. 9—2. (*Junci.*) [From a Greek word signifying abundance, from the number of stamens.]

tenuifo′lia, (y. r. ♃.) very glabrous; leaves very narrow-ensiform; sheaths of the spike 1-flowered. 1-2 f.

PO′A. 3—2. (*Gramineæ.*) [From a Greek word, signifying grass.]

annu′a, (Ap. ⊙.) panicle sub-secund, divaricate; spikelets ovate-oblong, 5-flowered; florets free; culm oblique, compressed; root fibrous. 6-8 i.

praten″sis, (J. ♃.) panicle diffuse; upper leaves much shorter than the smooth sheaths; florets acute, 5-nerved, webbed at the base; stipule short-truncate, root creeping. 2-3 f.

aquat″ica, var. *america′na*, (Au. ♃.) panicle erect, semi-verticillate, diffuse; branches flexuous, smooth; spikelets linear, 6-8-flowered; florets ovate-obtuse, free; leaves broad-linear, smooth; sheaths smooth. 4-5 f.

trivia′lis, (Ju. ♃.) panicle equal, diffuse; spikelets oblong-ovate, about 3-flowered; florets webbed at the base, 5-nerved; culm and sheaths roughish; stipules oblong; root creeping. 2-3 f.

compres′sa, (blue-grass, Ju. ♃.) panicle contracted, somewhat secund; spikelets oblong, 3-6-flowered; florets webbed; glumes nearly equal; culm oblique, compressed; root creeping. Var. *sylves″tris*, panicle loose, spreading; spikelets 2-3-flowered; culm slender, nearly erect. 12-18 i.

seroti′na, (J. ♃.) panicle elongated, diffuse, at length somewhat secund; spikelets lance-ovate, 2-3-flowered; florets a little webbed at the base, yellow at the tip, obscurely 5-nerved; root creeping. 2-3 f.

nemora′lis, (♃.) panicle attenuated, weak; branches flexuous; spikelets ovate, about 3-flowered; florets loose, slightly webbed, acute, obsoletely nerved; stipule almost wanting. 2 f.

nerva′ta, (J. ♃.) panicle equal, diffuse; branches weak, at length pendulous; spikelets 5-flowered; florets free, conspicuously -nerved, obtuse. 3-4 f.

obtu′sa, (Au. ♃.) panicle ovate, contracted; spikelets ovate, tumid, 5-7-flowered. florets free; glumes scarious; palea ovate, smooth, obtuse; lower one indistinctly 7-nerved; leaves as long as the culm, with the sheaths smooth. 2-4 f.

canaden″sis, (Ju. ♃.) panicle large, effuse; branches semi-verticillate, flexuous at length pendulous; spikelets ovate, tumid, 5-8-flowered; florets free; lower palea acutish, 7-nerved; upper one very obtuse; stamens 2. 3-4 f.

capilla′ris, (Au. ⊙.) panicle very large loose spreading, capillary; spikelets 3-flowered, ovate, acute; florets free; culm branched at the base; leaves hairy. 12 i.

pectina′cea, (Ju. ⊙.) culm cespitose, oblique; leaves hairy at the base; panicle capillary, expanding, pyramidal, hairy in the axils; spikelets linear, 5-9-flowered, florets free, acute, upper palea persistent 8-12 i.

rep″tans, (Au. ⊙.) diœcious; culm branched, creeping; panicle fascicled, spikelets lance-linear, 12-20-flowered, florets acuminate. Var. *cæspito′sa*, culm very short, cespitose; spikelets much crowded oblong. 8 i.

eragros″tis, (Ju. ⊙.) panicle equal, spreading; lower branches hairy in the axils spikelets linear-lanceolate, 9-15-flowered florets obtuse; root fibrous. 12-18 i.

ten″uis, (Au.) panicle branching, expanding, capillary; spikes 3-flowered, glabrous long peduncled; leaves linear, very long. 12-18 i. *S.*

parviflo′ra, (J. ♃.) panicle diffuse, capillary; spikelets small, generally 3-flowered; flowers obtusish, striate, caducous; leaves distichous, flat. 12-18 i. *S.*

confer″ta, panicles terminal and axillary, erect, compressed, with clustered flowers; spikelets 8-flowered, glabrous. 2-3 f. *S.*

angustifo′lia, (M. ♃.) leaves linear, involute; panicle somewhat crowded; spikes lanceolate, acute, 4-flowered; flowers villose at the base. 1-2 f. *S.*

ni′tida, (Ju.) stem erect, very glabrous, panicle large, diffuse, capillary, sub-verticillate; peduncles long; spikes lanceolate, 8-flowered. 1 f. *S.*

rigi′da, (M. ♃.) panicle lanceolate, little branched, secund; branches alternate, secund. 2-4 i. *S.*

airoi′dea, panicle attenuated, erect branches capillary, loose, semi-verticillate, leaves with very long sheaths, short and acute; spikelets oblong, obtuse, sub-sessile, 4-6-flowered; glumes unequal, shorter than the palea. 4-5 f *S.*

PODOPHYL″LUM. 12—1. (*Ranunculaceæ.*) [From *pous*, foot, and *phulion*, leaf, on account of the shape of its leaf.]

pelta′tum, (wild mandrake, may-apple w. M. ♃.) stem terminated with 2 peltate, palmate leaves; flower single, inserted in the fork formed by the petioles of the leaves. Sometimes the plant is 8-leaved, and the flower inserted on the side of one of the petioles. 1-2 f.

PODOS″TEMUM. 19—2. (*Aroideæ.*)

ceratophyl″lum, (thread-foot, Ju. ♃.) stem filiform, floating; leaves pinnate; flowers axillary. Attached to rocks and large stones in shallow waters.

abrotanoi′des, divisions next to frond very branching; the terminal ones capillary, dichotomous, many-cleft floral spathe elongated. No root distinct from the stem. *S.*

PODOSTIG″MA. 18—5. (*Apocyneæ.*) [From *pous*, foot, and *stigma*, stigma.]

pubes″cens, (y-g. M. ♃.) erect; leaves linear; umbels terminal and axillary; petals erect, longer than the calyx; corpuscle pedicelled. 12-18 i. *S.*

vir″idis, (g. and p. M. ♃.) erect, leaves oblong, obtuse, petiolate; petals large, erect; umbels generally terminal. *S.*

POGO′NIA. 18—1. (*Orchideæ.*) [From a Greek word signifying beard.]

ophioglossoi′des, (snake-mouth arethusa, r. Ju. ♃.) root fibrous; scape with 2 distant leaves, 1-2-flowered; leaves lance-oval; lip fringed. 8-12 i.

verticilla′ta, (y-r. J. ♃.) leaves 5-verticillate; flower solitary; 3 outer segments of the perianth long and linear; the inner ones lanceolate, obtuse; lip 3-lobed, dilated, the middle lobe undulated; root fasciculate. Swamps.

divarica′ta, (p. J. ♃.) root fibrous; scape 1-flowered, with two distant, lance-oblong leaves; outer petals long-linear, expanding; lip sub-3-lobed, crenulate. 18-24 i. *S.*

POLANIS″IA. 12—1. (*Capparides.*)

graveo′lens, (false mustard, r. w. Ju. ☉.) viscid-pubescent; leaves ternate; leafets elliptical-oblong; flowers generally dodecandrous. 1 f.

tenuifo′lia, viscid-glandular; leaves 3-foliate, nearly glabrous; leafets filiform-linear, longer than the petiole; petals very unequal, sub-orbicular, entire, on short claws; stamens 9-11; style longer than the ovary; pods linear, terete, minutely reticulated. glabrous. Georgia.

POLEMO′NIUM. 5—1. (*Polemonia.*) [An ancient name derived from *polemos*, war, because, according to Pliny, kings contended for the honor of its discovery.]

rep″tans, (Greek valerian, b. M. ♃.) leaves pinnate, leafets 5-13; flowers terminal, nodding.

POLYCAR″PON. 3—3. (*Amaranthi.*) [From *polus*, many, and *karpos*, seed or fruit.]

tetraphyl″lum, (w. J.) leaves opposite and in fours, obovate, obtuse, entire, glabrous, narrowed at the base; calyx persistent; capsule ovate, 1-celled; stem branching glabrous, striate, knotted. 3-6 i. *S.*

POLYCNE′MUM. 3—1. (*Atriplices.*) [From *polus*, and *kneme*, a leg or knee, from the number of jointed branches, or joints of the stem.]

america′num, (♃.) cespitose; leaves connate, crowded, subulate, 3-angled, rather pungent; flowers terminal. *S.*

POLYAN″THES. 6—1. ((*Narcissi.*) [From *polus*, many, and *anthos*, flower, because it bears many flowers.

tubero′sa. (tuberose, ♃.) flowers alternate, in pairs, rootlets tuberous; scape scaly; leaves linear, long; sweet-scented. Ex. The polyanthus of the gardens belongs to the genus Primula.

POLYG″ALA. 16—6. (*Leguminosæ.*) [From *polus*, much, and *gala*, milk, from its milky juice.]

paucifo′lia, (flowering wintergreen, r M. ♃.) small, large-flowered; stem simple erect, naked below; leaves ovate, acute, glabrous, near the top of the stem; flowers crested, terminal, about in threes. 3-4 i.

sen″ega, (seneca snake-root, mountain-flax, r. or w. J. ♃.) stem erect, simple, leafy; leaves alternate, lanceolate; spike terminal, filiform; flowers alternate, not crested. Var. *al″bida*, leaves lanceolate or oval; spike somewhat crowded; flowers white, sub-sessile. 8-14 i.

polyg″ama, (ground-flower, p. J. ♃.) stems numerous; leaves linear-oblong, alternate downwards; racemes terminal and lateral, elongated; flowers sessile; radical racemes procumbent, with apterous flowers. 4-8 i.

purpu′rea, (r. Ju. ☉.) stem fastigiately branched; leaves alternate, oblong-linear; flowers beardless, imbricated in obtuse cylindrical spikes; rachis squarrose; wings of the calyx cordate, ovate, erect, twice as long as the capsule. 12-18 i. Woods and hill-sides.

lu′tea, (yellow milkwort, y. S. ♂.) stem simple or branched; lower leaves spatulate, upper ones lanceolate; flowers in globular heads; wings of the calyx ovate, mucronate; bracts shorter than the flowers. 8-16 i. Pine barrens.

incarna′ta, (r. J. ☉.) stem nearly simple, erect, glaucous; leaves scattered, subulate, spikes oval, oblong; tube of the corolla long, slender. *S.*

sanguin″ea, (r. Ju. ☉.) erect; branches fastigiate; leaves linear; spikes crowded; flowers not fimbriated; rachis squarrose. 12-18 i.

verticilla′ta, (dwarf snake-root, w. J. ☉.) erect, branching; leaves whorled and scattered; spike filiform, peduncled; flowers distinctly alternate, approximate, crested; calycine wings shorter than the fruit. 6-8 i

ambig″ua, (p. ☉.) erect; leaves linear, lower ones verticillate, the rest scattered; spikes acute, long-peduncled; flowers cristate; calycine wings round and veined, as long as the fruit; bracts deciduous.

crucia′ta, (r. g. Ju. ☉.) stem fastigiate, wing-angled; leaves verticillate in fours linear-oblong; flowers in spiked sessile heads. 8-12 i.

corymbo′sa, (g-y. Ju. ♃.) stem erect, terete, nearly naked; lower leaves long, linear-lanceolate, stem leaves subulate, minute near the summit; racemes corymbed; rachis squarrose. 2-4 f.

seta′cea, (Ju. ☉.) stem setaceous, nearly leafless, simple, sparingly branched near the summit; leaves small, setaceous, scattered; flowers minute, in a compact spike. *S.*

viridis″cens, (g-y. Ju.) stem simple; leaves cuneate, obovate, obtuse; head cylindric, squarrose; calycine wings conspicuously acuminate. 1-4 i. *S.*

baldwin″ia, (y-w. Ju.) stem slightly an gled, branching near the summit; radical leaves spatulate, obtuse, cauline ones lanceolate, small; flowers capitate, heads squarrose, corymbed, calycine wings setaceous, acuminate. 2-3 f. *S.*

boykin″ia, (g-w.) flowers cristate; stem simple; leaves 4-5 verticillate, oblong-oval, lanceolate or acute; upper ones scattered; spike solitary, long-peduncled, lax-flowered. *S.*

cymo'sa, (J. Au. y.) cyme simple; spikelets ovate; wings elliptical-oblong, rather obtuse, mucronate; superior sepal half as large as the wings, rather obtuse; lateral petals distinct nearly to the base; crest minute; seed sub-globose, glabrous; stem simple, terete, attenuated upward; radical leaves linear-spatulate, cauline ones linear-subulate, minute. 2-5 f.

POL″YGO'NUM. 8—3. (*Polygoneæ.*) [From *polus*, many, and *gone*, a joint, on account of the many joints in its stem.]

1. *Flowers axillary.*

avicula're, (knot-grass, w. M. ♃.) leaves lanceolate, scabrous at the margin; stipules short, laciniate; stem procumbent; flowers sub sessile, axillary, minute. 6-12 i.

fagop″yrum, (buckwheat r-w. Ju. ☉.) racemes panicled; leaves heart-sagittate; stem erectish, unarmed; angles of the seeds equal. 1-2 f. Ex.

orien″tale, (prince's feather, r. Au. ☉.) stem erect; leaves very large, petioled, ovate, acuminate, minutely pubescent; stipules hairy, somewhat sabre-form; flowers in crowded, terminal spikes. 4-5 f. Old fields and road-sides. Flowers in large, pendulous, crimson spikes. Naturalized.

erec″tum, (w. J. ♃.) stem branched; leaves broad, oval, petiolate; flowers pentandrous. 1-3 f.

mariti'mum, (w-r. Au. ♄.) stamens 8; leaves lanceolate, thick and glaucous, margin revolute; stipules lacerate; stem diffuse, prostrate, suffruticose. 1-2 f. *S.*

ten″ue, (w. Ju. ☉.) stem erect, slender, branched, acute-angled; leaves long-linear, straight, acuminate; stipules tubular; apex villose; flowers alternate, sub-solitary. 9-18 i.

2. *Flowers in slender spikes.*

lapathifo'lium, (r. w. Au. ☉.) stipules awnless; stamens 6; styles 2; peduncles scabrous; spikes numerous, rather crowded; leaves lance-ovate, short-petioled, pubescent above. 2-4 f.

puncta'tum, (water-pepper, w. Au. ☉.) flowers octandrous, glandular; styles 3; stipules ciliate, spotted; leaves lanceolate, glabrous; spike filiform, at first cernuous; bracts remotely alternate. 1-2 f.

mi'te, (tasteless knotweed, J. ☉.) flowers octandrous, in crowded spikes; styles 3; leaves narrow-lanceolate, sub-hirsute; stipules hirsute, long-ciliate; bracts ciliate, sub-imbricate. 12-18 i.

virginia'num, (w. Ju. ♃.) stamens 5; styles 2, unequal; stem simple, angular; leaves broad-oval, spikes virgate; flowers remote. 2-4 f.

bistortoi'des, (w-r. J. ♃.) bracts 1-flowered, 2-3 valved; leaves oval, flat, petioled; stem simple, 1-spiked.

3. *Flowers in thick crowded spikes.*

vivipa'rum, (r. Au. ♃.) stem simple; spike linear, solitary; leaves lance-linear, margins revolute; bracts ovate, acuminate. 6 i.

barba'tum, (r. w. Ju.) stamens 6; styles 3; spike virgate, truncate; bristle ciliate; leaves oblong, acute, smoothish. 18-24 i.

persica'ria, (r. Ju. ☉.) stamens 6; styles 2; spikes ovate oblong, erect; peduncles smooth; leaves lanceolate; stipules smoothish, ciliate. 1-2 f.

pennsylva'nicum, (Ju. ☉.) flowers octandrous; spikes oblong; leaves lanceolate stipules smooth and naked; stem geniculate. 2-4 f.

amphib″ium, (mud knotweed, Ju. r. ♃.) leaves petiolate, oblong-lanceolate, sometimes cordate at base; flowers in dense, terminal spikes, pentandrous; styles bifid; stem nearly erect. Var. *terres″tre*, leaves smooth above, slightly pubescent beneath, spike ovate, oblong. Var. *aquat″icum* leaves floating, ovate-lanceolate; spike cylindric-oblong.

4. *Flowers in spiked panicled racemes.*

articula'tum, (joint weed, r. Ju. ☉.) leaves linear, obtuse; flowers octandrous, styles 3; spikes paniculate, filiform, erect, pedicels solitary, articulate near the base. Sandy plains.

5. *Flowers sub-racemed; leaves cordate, sagittate, or hastate.*

sagitta'tum, (w. J. ☉.) stem prostrate, square; the angles awned with reversed prickles; leaves sagittate; flowers octandrous, in small peduncled heads. Wet grounds.

arifo'lium, (r-w. Ju. ☉.) stem prostrate, square, the angles with reversed prickles; leaves long-petioled, hastate; spikes few-flowered; flowers hexandrous; styles 2 or 1. 2-4 f.

convol″vulus, (w. r. Ju. ☉.) stamens 8; styles 3; leaves petioled, oblong, hastate-cordate; stem long, twining; segments of the perianth bluntly keeled.

scan″dens, (climbing buckwheat, w. r. Au. ♃.) stamens 8; styles 3; leaves broad-cordate; stipules truncate, naked; stem twining, glabrous; calyx bearing the fruit 3-winged.

cilino'de, (Ju. ☉.) stamens 8; styles 3, leaves cordate; stipules sub-acute, surrounded at the base with an outer ciliate series; stem angled, prostrate or climbing; divisions of the calyx obtusely keeled.

hirsu'tum, (w. Ju. ☉.) stamens 7; styles 3-cleft; spikes filiform; stem and stipules very hirsute; leaves lanceolate, hirsute, punctate. 2 f. *S.*

fimbria'tum, (w. Au.) spikes panicled, flowers solitary, fimbriate; stipule truncate, fringed; leaves linear, acute at each end 2 f. *S.*

seta'ceum, (w. Ju.) flowers octandrous styles 3-cleft; peduncles long, 2-spiked spikes interrupted, hirsute; leaves broad lanceolate, acuminate, hirsute; stipules hirsute, ciliate; stem erect, glabrous. 1-2 f. *S.*

gra'cile, (g-w. ☉.) diœcious, glaucous; racemes slender, filiform; flowers deflected, longer than the peduncles; peduncle articulated to the calyx; leaves spatulate-linear, obtuse; fruit longer than the calyx. 1-4 f. *S.*

POLYM″NIA. 17—4. (*Corymbiferæ.*) [Named from *Polyhymnia*, the muse of eloquence.]

canaden″sis, (y. J. ♃.) viscid-villose; leaves denticulate, acuminate, lower ones pinnatifid, upper 3-lobed or entire. 2-4 f. Flowers in a loose terminal panicle. Shady hills.

uveda'lia, (yellow leaf-cup, y. Ju. ♃.) leaves opposite, 3-lobed, acute, decurrent into the petiole; lobes sinuate-angled; rays elongated. 3-5 f.

POLYPO'DIUM. 21—1. (*Filices.*) [From *polus*, many, and *pous*, foot, because it has many roots.]

vulga're, (polypod, Ju. ♃.) frond deeply pinnatifid; divisions lance-linear, obtuse, crenulate, approximate, upper ones gradually smaller; fruit dots solitary; root chaffy. 8-12 i.

hexagonop″terum, (Ju. ♃.) fronds bipinnatifid, rather smooth, circumference triangular, lower divisions deflexed; segments lanceolate, obtuse, ciliate, upper ones entire, lower ones adnate-decurrent; sori minute, solitary; stipe smooth. 12-16 i.

connec″tile, (Ju. ♃.) fronds bipinnatifid, ciliate, triangular; divisions opposite, contiguous, adnate; segments sub-elliptical; stipe chaffy; sori minute. 12 i.

virginia'num, (Ju. ♃.) fronds deeply pinnatifid; divisions lanceolate, obtuse, very entire, approximate, upper ones gradually smaller; sori and root solitary. *S.*

inca'num, (Ju. ♃.) fronds deeply pinnatifid; divisions alternate, linear, very entire, obtuse, upper ones gradually smaller, scaly beneath; stipe scaly, fruit-bearing at the apex; sori solitary. *S.*

POLYPRE'MUM. 4—1. (*Gentianeæ.*) [From *polus*, many, and *premnon*, stalk or shoot.]

procum″bens, (w. Ju. ☉.) stem herbaceous, procumbent, furrowed, margins of the furrows sharply serrulate, dichotomous above; leaves opposite, linear, sessile, finely serrulate, sub-decurrent. 6-12 i.

POLYP″TERIS. 17—1. (*Corymbiferæ.*) [From *polus*, many, and *pteris*, a wing, alluding to the many-valved (or winged) egret.]

integrifo'lia, (♃.) erect; sub-scabrous, branching above; leaves alternate, scabrous, entire, linear-lanceolate; style 2-cleft, longer than the stamens. 3-4 f. *S.*

POLYTRI'CHUM. 21—2. (*Musci.*) [From *polus*, many, and *thrix*, hair, so called from its resemblance to hair.]

juniperi'num, (hair-cap moss, M. ♃.) stem generally simple; leaves lance-linear, entire, flattish, somewhat spreading; the apophysis depressed. In dry woods, &c.

POMA'RIA. 10—1. (*Leguminosæ.*)

glandulo'sa, (y. ♄.) branching; glandular-punctate; branches slender, sub-pubescent; leaves abruptly bipinnate; leafets ovate, oblique at the base, entire, sessile, sub-pilose smooth and pale-green above. *S.*

PONTEDE'RIA. 6—1. (*Narcissi.*) [Name from an ancient botanist, Pontidera.]

corda'ta, (pickerel-weed, b. Ju. ♃.) leaves heart-oblong, obtuse; spike many flowered, compact; divisions of the corolla oblong. Var. *angustifo'lia,* leaves elongated, triangular, truncate, and sub-cordate at the base. 1-2 f.

POP″ULUS. 20—8. (*Amentaceæ.*) [The origin of the name is doubtful.]

tremuloi'des, (white poplar, American aspen, Ap. ♄.) leaves heart-roundish, abruptly acuminate, tooth-serrulate, glabrous, a little pubescent at the margin, with two glands at the base, on the upper side; petioles compressed, in the young state silky. 20 30 f.

balsamife'ra, (balsam poplar, Ap. ♄.) leaves ovate, acuminate, white, and net-veined beneath; buds resinous. 70-80 f.

angula'ta, (balm of Gilead, Ap. ♄.) leaves ovate-deltoid, acuminate, glabrous, branches wing-angled. 80 f.

dilata'ta, (Lombardy poplar, Italian poplar, Ap. ♄.) leaves glabrous both sides, acuminate, serrate, deltoid, the breadth equal to, or exceeding the length; branches erect, close to the stem. It is said no pistillate plant of this species has been brought to America; consequently no seeds are obtained from it. 40-80 f. Ex.

grandiden″tata, (tree poplar, Ap. ♄.) leaves round-ovate, acute, unequally and coarsely sinuate-toothed, glabrous, when young, villose; petioles compressed. Var. *pen″dula,* branches pendulous. 40-50 f.

betulifo'lia, (birch-leaf poplar, Ap. ♄.) leaves rhomboidal, long-acuminate, dentate, glabrous; young branches pilose. 30-40 f.

can″dicans, (Ap. ♄.) leaves cordate, ovate, acuminate, obtusely and unequally serrate, white beneath, sub-3-nerved, reticular veined; petioles hairy; buds resinous. 40-50 f.

læviga'ta, (cotton-tree, Ap. ♄.) leaves round-ovate, deltoid, acuminate, sub-cordate, unequally serrate, glabrous, glandular at base; petioles compressed; younger branches angled. 70-80 f.

heterophyl″la, (various leaved poplar, M. ♄.) leaves round-ovate, cordate; the sinus small, cordate and somewhat auricled, when young, tomentose. 70-80 f.

monolife'ra, (Ap. ♄.) leaves sub-cordate-deltoid, glabrous, glandular at the base with cartilaginous, sub-pillose, hooked serratures; nerves spreading; petioles compressed above; older branches terete. 60-70 f.

græ'ca, (Athenian poplar, Ap. ♄.) leaves cordate-ovate, acuminate, obsoletely serrate; petioles compressed. 20-40 f. Ex.

PORCEL″IA. 12—12. (*Annonæ.*) [In hono. of Porcel, a distinguished Spanish botanist.]

trilo'ba, (custard apple, paw-paw, p. Ap. ♄.) leaves smoothish, oblong-wedge-obovate; outer petals orbicular; fruit large, fleshy. 30 40 f.

parviflo'ra, (g-p. M. ♄.) leaves wedge-obovate, mucronate, under surface and branches rufous-pubescent; outer petals scarcely twice as long as the calyx. 4 f. *S* *pygma'ea*, (Ap. ♄.) leaves long-linear, wedge-form, obtuse, coriaceous, with the branches glabrous; outer petals obovate-oblong, much larger than the calyx. 6-18 i. *S.*

grandiflo'ra, (y-w. Ap. ♄.) leaves wedge-obovate, obtuse, under surface and branches rufous-pubescent; outer petals obovate, much larger than the calyx. 18-24 i. *S.*

PORTULAC''CA. 12—1. (*Portulacceæ.*) [From *porto*, to carry, *lac*, milk.]

olera'cea, (purslane, y. J. ☉.) leaves wedge-form; flowers sessile.

pilo'sa, (☉.) leaves subulate, alternate; axils pilose; flowers sessile, terminal. *S.*

POTAMOGE'TON. 4—4. (*Junci.*) [From *potamos*, a river, and *geiton*, adjacent, so called because it grows about rivers.]

natans, (pond-weed, g. J. ♃.) leaves long-petioled, floating, lance-oval; at first some are sub-cordate. On water.

flui'tans, (g. Ju. ♃.) lower leaves long, linear, upper ones lanceolate, nerved, coriaceous; all petioled. In water.

heterophyl''lum, (variegated pond-weed, g. Ju. ♃.) upper leaves floating, coriaceous, elliptical, petiolate, lower ones membranous, linear-lanceolate, sessile.

diversifo'lium, (g. Ju. ♃.) upper leaves floating, elliptical, petiolate, 5-nerved, lower ones filiform; spike axillary, almost sessile, few-flowered. Water.

perfolia'tum, (g. Ju. ♃.) leaves amplexicaul, cordate, ovate; spike few-flowered, on a short peduncle Water.

lu'cens, (g. Au. ♃.) leaves ovate-lanceolate, petiolate, pellucid, and finely veined; spike long, cylindrical.

cris''pum, (r-g. J. ♃.) leaves lanceolate, tapering, sessile, undulate, serrate; spike 8-10 flowered. Lakes.

pectina'tum, (g. J. ♃.) leaves setaceous, distichus, alternate, sheathing; spikes terminal, interrupted.

gramin''eum, (grass pond-weed, g. Ju. ♃.) leaves linear, grass-like, alternate, sessile; stipules broad; stem terete, sub-dichotomous. In July, some of these plants begin to raise their spikes of unopened flower-buds to the surface of the water; as soon as the stigmas are fertilized by the pollen, the spikes are again withdrawn, to ripen the fruit under water; others succeed them, and the process continues.

compres''sum, (g. Ju. ♃.) leaves linear, obtuse, sessile; stem compressed; spike 4-6 flowered.

rosterifo'lium, (g-y. Au. ♃.) leaves alternate, linear, closely sessile; stem flexuous, compressed, sub-alate; branches axillary; stipules lance-linear, acute; spikes many (20-40) flowered. 2-3 f.

POTENTIL''LA. 11—12. (*Rosaceæ.*) [From *potentia*, power, so named on account of its supposed power to heal diseases.]

A. *Leaves digitate.*

canaden''sis, (common five-finger, y. M. ♃.) procumbent, sub-ramose, whitish-silky; stipules ovate, gashed; leaves wedge-ovate, gash toothed; stem ascending and creeping, hirsute; peduncles solitary, elongated; divisions of the calyx lance-linear; petals orbicular, sub-entire, of the length of the calyx. 2-18 i.

argen''tea, (silver five-finger, w-y. Ju. ♃.) stem prostrate and ascending, rarely sub-erect, branching, white-downy; stipules ovate, acute; leaves wedge-form, gash-toothed, silvery white beneath; petals retuse, scarcely longer than the calyx. 4-10 i.

sim''plex, (y. Ap. ♃.) erect, simple, hirsute; leaves oblong-oval, coarsely toothed; peduncles axillary. solitary, long, 1-flowered; petals nearly round, obcordate, longer than the calyx.

sarmento'sa, (y. M. ♃.) stem sarmentose, leafets obovate, obtuse, serrate, glabrous above, hirsute beneath; petals roundish, longer than the calyx.

rec''ta, (y. J. ♃.) erect; leaves in fives and sevens; leafets lanceolate, coarsely toothed; petals obcordate, larger than the calyx; corolla large, pale.

B. *Leaves pinnate.*

anseri'na, (tansey cinquefoil, y. J. ♃.) creeping; leaves interruptedly pinnate numerous, gash-serrate, silky, white-downy beneath; peduncles solitary, 1-flowered.

frutico'sa, (shrubby cinquefoil, y. J. ♃.) stem fruticose, oblong, lanceolate, entire, approximate; stipules lanceolate, membranous, acute; flowers in corymbs, large; petals longer than the calyx. A shrub 2 feet high, much branched, hairy. Margin of swamps.

pennsylva'nica, (y. Ju. ♃.) erect, very soft, somewhat whitish-villose; leafets oblong, obtuse, sub-pinnatifid, woolly; panicle straight, many-flowered; segments of the calyx semi-oval.

supi'na, (y. J. ☉.) stem decumbent, dichotomous; leafets oblong. incisely serrate; peduncles axillary, solitary, 1-flowered.

argu'ta, (w. J. ♃.) stem erect, pubescent, viscous above; leaves unequally pinnate; leafets somewhat round-ovate. oblique at the base, doubly gash-toothed; stipules sub-entire; calyx acute, somewhat shorter than the corolla. 1-3 f.

humifu'sa, (y. M.) leaves digitate, quinate; leafets wedge-oblong, obtuse, gash-toothed, white-tomentose beneath; peduncles short, filiform, procumbent. 4-5 i. *S*

russellia'na, (♄.) the most beautiful species produces rich, dark, scarlet flowers. A low shrubby plant. Ex.

formo'sa, deep red or purple flowers blossoming from May to August. Ex.

C. *Leaves ternate.*

tridenta'ta, (mountain cinquefoil, w. Ju. ♃.) smoothish; stem ascending, dichotomous; leaves ternate-palmate; leafets wedge-oblong, coriaceous, 3-toothed at the summit, pubescent beneath; stipules lanceolate, acuminate; corymb loose, few-flowered; petals oblong-ovate, longer than the calyx; stem 3-6 inches high. Mountains. Frozen regions to Car.

norwe'gi'ca, (Norway cinquefoil, y. J. ☉.) hirsute; stem erect, dichotomous above; leaves ternate, palmate; leafets lance rhombic, simply and doubly serrate; flowers numerous, sub-corymbed, and axillary; petals obcordate, shorter than the calyx. 8-10 i. Old fields. Can. to Car.

villo'sa, (hairy five-finger, ♃.) assurgent, silky-villose; stipules broad, membranaceous, entire; leafets sessile, approximate, with shining, close-pressed hairs above, hoary-tomentose beneath; peduncles short, aggregate; petals obcordate, longer than the calyx.

hirsu'ta, (w. Ju. ♃.) erect, simple, very hirsute; leafets roundish, deeply dentate; stipules lanceolate, sub-entire; flowers axillary, sub-corymbed; petals oblong-linear, shorter than the calyx.

POTE'RIUM. 19—12. (*Rosaceæ.*) [From *poterion*, a cup, so called from the shape of the flowers.]

sanguisor''ba, (burnet, J. ♃.) stem somewhat angled, unarmed; leaves pinnate; leafets serrate; flowers in heads. Ex.

PRENAN''THES. 17—1. (*Cichoraceæ.*) [From *prenes*, drooping, and *anthos*, flower.]

al''ba, (white lettuce, w. p. Au. ♃.) radical leaves angled, hastate, toothed, somewhat lobed, cauline ones round-ovate, toothed, petioled, upper ones mostly lanceolate; panicle lax; the terminal fascicle nodding; calyx 8-cleft, 8-10 flowered. Var. *na'na*, leaves 3-parted, hastate, ovate, and lanceolate, sometimes all simple; racemes panicled or simple. 1-3 f.

altis''sima, (p. y. Au. ♃.) stem branching; leaves petioled, 3-lobed, angled, denticulate; margin scabrous; racemes axillary; flowers nodding; calyx about 5-flowered.

corda'ta, (w. y. Au. ♃.) stem panicled above; leaves petioled, cordate, toothed, ciliate; floral ones sessile, oblong, entire; panicle lax; raceme flowered. 4-6 f.

virga'ta, (w-p. Au. ♃.) glabrous; stem very simple; leaves all lyrate-sinuate; branches somewhat 1-sided; flowers pendent; involucre glabrous, 8-cleft, 10-flowered. 3-6 f.

crepidin''ea, (S.) leaves broad lanceolate, attenuated at the base, unequally tooth-angled; panicle fascicled, terminal, few-flowered, nodding; involucrum hirsute, 10-12 cleft, about 20-flowered. 4-6 f.

deltoi'dea, (p. S.) stem simple, glabrous; leaves deltoid, acuminate, acutely denticulate, sub-glaucous beneath; racemes axillary, few-flowered; involucrum 5-flowered. 2 f.

pauciflo'ra, stem branching, flexuous, panicled above; branchlets 1-flowered; flowers erect; leaves lance-linear, runcinate, glabrous; involucrum about 5-flowered.

illinoien''sis, stem simple, and with the leaves, very rough; leaves all undivided, lance-oval; raceme long; fascicles sub-sessile, erect, hirsute. *S.*

PRIMU'LA. 5—1. (*Primulaceæ.*) [From *primulus*, the beginning, so called because it blossoms in the beginning of spring. The natural family, Primulaceæ, is a division of Jussieu's order, Lysimachiæ.]

farino'sa, (bird's eye primrose, p. ♃.) leaves obovate-spatulate, mealy beneath, umbel many-flowered; peduncles spreading; border of the corolla flat, as long as the tube, with obtuse, obcordate segments scape 6-10 i. Leaves all radical.

mistasin''ica, (♃.) small, glabrous; leaves oval-spatulate, sub-dentate; scape elongated; umbel few-flowered; limb of the corolla reflexed; segments wedge-oblong, obtusely 2-cleft; capsule oblong, exsert.

angustifo'lia, (p.) leaves lance-oval, very entire, glabrous; scape 1-flowered; segments of the corolla ovate, very entire 1-2 i.

cortusoi'des, a very ornamental species producing red flowers from May to July. Ex.

præni'tens, (Chinese primrose,) a beautiful species, of which there are many varieties with pink, with white, and with semi-double flowers. Ex.

acau'lis, (primrose, ♃.) leaves rugose, toothed, hirsute beneath; scape 1-flowered. Ex.

auric''ula, (auricula primrose, ♃.) leaves serrate, fleshy, obovate; scape many-flowered; calyx mealy. Ex.

ve'ris, (cowslip, r-y. ♃.) leaves rugose toothed; limb of the corolla concave; neck of the tube oblong; calyx inflated.

ela'tior, (oxlip primrose, w. y. ♃.) stalk many-flowered; limb of the corolla flat, flowers in an umbel, pale yellow, the centre deeper yellow; this is supposed to be a hybrid, between the primrose and cowslip.

vulga'ris, the English botanists describe the *acaulis* under this name; it is the polyanthus of the florist.

PRI'NOS. 6—1. (*Rhamni.*)

verticilla'tus, (winter berry, w. J. ♄.) stem much branched; leaves deciduous, oval, serrate, acuminate, pubescent beneath; flowers diœcious, 6-cleft; sterile ones axillary, sub umbellate; fertile ones aggregated, berries globose. Berries bright scarlet. 6-8 f. Swamps.

gla'ber, leaves evergreen, wedge-form, coriaceous, shining; pedicels axillary, mostly 3-flowered; berries black and shining, globose. 3-4 f. Ink-berry.

lævigа'tus, (Ju. ♄.) leaves deciduous, lanceolate with appressed serratures, glabrous both sides, shining above; nerves beneath scarcely pubescent; flowers 6-cleft; pistillate flowers axillary, solitary, sub-sessile; staminate flowers scattered. 6-8 f.

ambig''uus, (w. J. ♄.) leaves deciduous, oval, entire, acuminate at each end; flowers 4-cleft; staminate ones crowded on the lower branches, pistillate ones solitary, on long peduncles. A small tree with whitish bark. 3-5 f.

integrifo'lia, (♄.) leaves deciduous, oval, entire, mucronate, on long petioles, glabrous on both sides; pistillate flowers solitary, long-peduncled. *S.*

lanceola'tus, (J. ♄.) leaves deciduous lanceolate, finely and remotely serrulate, acute at each end, glabrous on both sides pistillate flowers scattered generally in pairs peduncled, 6-cleft; staminate ones aggregate, triandrous. *S.*

coria'ceous, (M. ♄.) leaves perennial, broad-oval, acute, serrate near the apex, lucid above, minute-punctate beneath; pistillate flowers solitary, generally 8-parted; staminate ones aggregate-octandrous. Var. *latifo'lia*, leaves lance-obovate, acuminate. Var. *angustifo'lia*, leaves lanceolate, acute. 5-6 f. *S.*

PROSERPINA'CA. 3—3. (*Hydrocharides.*) [From Proserpina, fabled as queen of the lower regions.]

palus''tris, (mermaid-weed, Au. ☉.) upper leaves lance-linear, serrate; lower ones often pinnatifid; fruit angular, acute, stem procumbent. Wet places.

pectina'ta, distinguished from the former, by having the leaves all finely pectinate, and the fruit with rather obtuse angles.

PROSO'PIS. 10—1. (*Leguminosæ.*) [From *Prosopon*, face, from the appearance of the fructification.]

glandulo'sa, (♄.) spines thick, cylindric-conic; leaves conjugate-pinnate, or pinnate in one pair; leafets distant, 6-7 pairs, linear, sub-falcate, obtuse, glabrous, sub-coriaceous; petiole between the leaves and leafets glandular; legumes straight; spikes cylindric.

PRUNEL''LA. 13—1. (*Labiatæ.*) [From *pruna*, a burn, because it heals burns.]

vulga'ris, var. *pennsylva'nica*, (heal-all, self-heal, J. ♃.) leaves petioled, oblong ovate, toothed at the base; lips of the calyx unequal; upper one truncate, awned stem ascending. 6-12 i.

PRU'NUS. 11—1. (*Rosaceæ.*) [*Prunus*, the Latin name for plum.]

A. *Flowers in racemes.*

virginia'na, (wild-cherry, rum cherry, cabinet-cherry, w. M. ♄.) racemes erect, elongated; leaves oval-oblong, acuminate, unequally serrate, glabrous both sides; petioles generally bearing 4 glands. In open fields, the limbs of this tree spread out into an elegant oval top; but in dense forests, it grows to a very great height, with a few contracted branches.

america'na, (yellow or meadow plum, w. m. ♄.) leaves oblong-oval, acuminate, sharply serrate, veined; pedicels smooth; stipules mostly 3-parted; drupe oval or sub-globose, reddish yellow, with a coriaceous skin. Banks of streams; meadows.

mariti'ma, (w. M. ♄.) peduncles sub-solitary; leaves ovate-oblong, acuminate, doubly serrate.

seroti'na, (choke-cherry, w. J. ♄.) flowers in lax racemes; leaves oval, short-acuminate, opake, doubly and acutely serrate; midrib bearded on each side towards the base; petiole with 2 glands.

canaden''sis, (w. ♄.) flowers in racemes; leaves glandless, broad-lanceolate, rugose, sharply serrate, pubescent both sides, tapering into the petiole.

spino'sa, (English sloe, ♄.) peduncles solitary; leaves lance-oval, pubescent beneath; fruit straight; branches thorny. Ex.

cera'sus, (garden cherry, w. r ♄) umbel sub-peduncled; leaves lance-ovate, glabrous, conduplicate. Ex.

domes''tica, (plum, w. M. ♄.) peduncles sub-solitary; leaves lance-ovate, convolute; branches thornless. Var. *julia'na*, (damson plum,) fruit oblong, blue. Var. *claudia'na*, (sweet plum, horse-plum,) fruit round, at first green, becoming yellowish. Var. *enuclea'ta*, (stoneless plum,) the putamen obsolete. Ex.

can''dicans, has long clusters of white flowers, leaves woolly. Very ornamental. Ex.

cacomil''la, a native of Italy.

divarica'ta, has white flowers and yellow fruit. Ex.

PSORA'LEA. 16—10. (*Leguminosæ.*) [From *psoraleus*, scabby; the plant being more or less glandular, which gives it a scurfy appearance.]

esculen''ta, (bread-root, b. J ♃.) villose, leaves quinate-digitate; leafets lanceolate, unequal, flat, entire; spikes axillary, dense-flowered; divisions of the calyx lanceolate, scarcely as long as the corolla, legume ensiform, beaked; root fusiform. The root is used for food by the Indians.

canes''cens, (y. J. ♃.) hoary; leaves trifoliate, short-petioled, broad-lanceolate, spikes lax-flowered; flowers pedicelled; calyx hairy, not as long as the corolla. *S.*

tenuifo'lia, (b. S. ♃.) pubescent, branching; leaves trifoliate; leafets oval, rugose-punctate on both sides; peduncles axillary, about 3 flowered, longer than the leaves. 2 f. *S.*

lupinel''la, (p. J.) stem sparingly branched; leaves digitate, long-petioled; leafets filiform; racemes many-flowered, longer than the leaves; legumes rugose. 2 f. *S.*

longifo'lia, (♃.) wholly silky-villose; leaves trifoliate; leafets long-linear; spikes axillary, peduncled, lax-flowered, shorter than the leaves; teeth of the calyx and bracts subulate. *S.*

onobry'chis, stem smooth; leaves trifoliate; leafets lance-ovate, sub-pubescent; racemes axillary, long-peduncled; flowers 1-sided; legume sub-ovate, muricate smooth. 3-5 f. *S.*

virga'ta, (b. ♃.) stem virgate, sub-pubescent; radical leaves oblong, ovate; cauline ones very narrow, glabrous; spikes axillary, shorter than the leaves. 2 f. *S.*

melilotoi'des, (p. J.) sub-pubescent; leaves trifoliate; leafets lance-oblong; spikes oblong; bracts broad-cordate, long-acuminate; pods round, nerved, very rugose. 1-2 f. *S.*

eglandulo'sa, (p. J. ♃.) pubescent, without glands; leaves trifoliate, oblong-lanceolate; spikes oblong; bracts broad, lanceolate, long-acuminate, and with the calyx villose. *S.*

multiju'ga, (p. J.) stem branching; leaves pinnate; leafets numerous (9-10 pairs) lance-oblong, obtuse, pubescent; spikes oblong; bracts small, membranaceous, glandless. 1-2 f. *S.*

PSYCHO'TRIA 5—1. (*Rubiaceæ.*) [From

psuchos, cool, ***otruno***, to excite, alluding to its properties.]

lanceola'ta, (♄.) branches and leaves reddish, hairy beneath; leaves lanceolate, acuminate at both ends; stipules clasping, roundish, caducous; corymb terminal, 3-forked at the base. Florida.

PTE'LEA. 4—1. (*Terebintaceæ.*) [From ***ptelea***, elm, the fruit of this genus resembling that of the elm.]

trifolia'ta, (g-w. J. ♄.) leaves trifoliate; flowers panicled, diœcious. Var. *pentaphyl″la*, leaves quinate. Var. *pubes″cens*, leaves pubescent. 6-8 f.

baldwin″ii, leaves very small, glabrous; leafets sessile, oval, obtuse, the terminal ones cuneiform at the base; flowers tetandrous; styles none. Florida.

monophyl″la, leaves simple, lanceolate-ovate, nearly sessile; flowers racemed; fruit 3-winged. *S.*

PTE'RIS. 21—1. (*Filices.*) [From ***pteron***, a wing, so called from the likeness of its leaves to wings.]

aquili'na, (common brake, Ju. ♃.) frond pinnate, 3-parted; barren branches doubly pinnate, with leafets lance-linear, obtuse pinnatifid, toothed; fertile branches pinnate, with leafets pinnatifid; divisions acutish, all ciliate.

atropurpu'rea, (rock brake, Ju. ♃.) frond pinnate; lower leafets lanceolate, obtuse, ternate or pinnate; at the base obtusely truncate or sub-cordate. Var. *veno'sa*, leafets veined beneath; stipe angled. Var. *puncta'ta*, leafets punctate beneath; stipe terete, dark purple. 3-10 i.

cauda'ta, (Au. ♃.) frond 3-parted, pinnate; barren divisions bi-pinnate; leafets linear, elongated, obtuse, entire; lower ones bi-pinnatifid; fertile branches pinnate; leafets remotish below; at the base pinnatifid, dentate.

peda'ta, (Ju. ♃.) frond deeply 5-lobed-palmate; lobes pinnatifid; segments lance-linear, acute. 6 i. *S.*

PTEROCAU'LON. 17—2. (*Corymbiferæ.*) [From ***pteron***, a wing, and ***kaulos***, a stem.]

pycnostach″ya, (black-root, w. Au. ♃.) stem erect, simple, winged; leaves lanceolate, slightly undulate, dentate, tomentose and white beneath; spike cylindric; flowers clustered. *S.*

PTEROSPO'RA. 10—1. (*Ericæ.*) [From ***pteron***, a wing, ***spora***, seed.]

androm″eda, (Albany beech-drops, r-y. Ju. ⊙.) scape purple, very tall, bearing a many-flowered raceme; flowers lateral and terminal, nodding; peduncles filiform, longer than the flowers; lanceolate scales below, none above. 1-2 f.

PULMONA'RIA. 5—1. (*Borragineæ.*) [From ***pulmo***, the lung, so called on account of its efficacy in diseases of the lungs.]

virgin″ica, (b. M. J. ♃.) smooth; stem erect; radical leaves obovate, oblong, obtuse leaves of the stem narrower; flowers in terminal racemes or fascicles; calyx much shorter than the tube of the corolla; segments lanceolate, acute; leaves somewhat glaucous; flowers large, bright blue. Plant becomes black by drying.

officina'lis, (spotted lung-wort b. M. ♃.) leaves ovate, hairy, generally speckled with white on the upper side; the lower leaves on long petioles, the upper ones sessile; flowers violet-blue. 12 i. Ex.

alpi'na, (b. ♃.) nearly glabrous; stem simple, assurgent; leaves spatulate-ovate; flowers in terminal fascicles, sub-sessile; segments of the calyx oblong, obtusish, ciliate, about half the length of the corolla. 6 i.

lanceola'ta, (b. w. ♃.) glabrous, erect, radical leaves very long-petioled, lanceolate; cauline ones linear-oblong; flowers sub-panicled; calyx short. *S.*

cilia'ta, (b.) glabrous; leaves lance-ovate attenuate at each end, ciliate on the margin; flowers fascicle-panicled, pedicelled; corolla tubular-bell-form; calyx short, 5 parted; segments ovate, obtuse. 1 f. *S.*

PU'NICA. 11—1. (*Rosaceæ.*) [From ***punicus***, Carthaginian.]

grana'tum, (pomegranate, ♄.) leaves lanceolate; stem woody. Ex.

PURSH″IA. 11—1. (*Rosaceæ.*) [In honor of Frederic Pursh, author of the North American Flora.]

tridenta'ta, (♄.) branches erect; branchlets numerous, short; leaves in fascicles, simple, 3-toothed, white beneath; flowers terminal or solitary. A North American shrub, with small yellow flowers, quite hardy.

PYCNAN″THEMUM. 13—1. (*Labiatæ.*) [From ***puknos***, dense, ***anthos***, flower, on account of its crowded inflorescence.]

A. *Stamens exsert.*

in″canum, (wild basil, mountain-mint, w. r. Ju. ♃.) leaves oblong-ovate, acute, sub-serrate, white-downy; flowers in compound heads, lateral ones peduncled; bracts setaceous. 1-5 f.

arista'tum, (w. Au. ♃.) leaves lance ovate, sub-serrate, on very short petioles, whitish; heads sessile; bracts awned; flowers very small, in one or two sessile whorls and a terminal head; bracts and calyx terminated by long awns.

linifo'lium, (Virginian thyme, w. Ju. ♃.) stem straight, much branched, somewhat scabrous; leaves linear, 3-nerved, very entire, smooth; heads terminal, in a fasciculate corymb; stem 12-18 inches high, with trichotomous, fastigiate branches; flowers minute, shorter within. Woods.

virgin″icum, (narrow-leaf Virginian thyme, w. J. ♃.) pubescent; leaves sessile, lance-linear, entire, punctate, heads terminal, corymbed; bracts acuminate. 12-18 i. Mich.

B. *Stamens included.*

verticilla'tum, (w. Au. ♃.) leaves lance-ovate, sometimes toothed; whorls sessile, compact; bracts acuminate. 2 f. Mountains.

lanceola'tum, leaves linear-lanceolate, entire, veined; heads terminally sessile, in fascicled corymbs.

mu'ticum, (w. Ju. ♃.) leaves lance-ovate, sub-dentate ribbed, sub-glabrous; heads terminal; bracts lanceolate, acutish. 18-24 i.

PYRO'LA. 10—1. (*Ericæ.*) [From *pyrus*, a pear, so called on account of the shape of the leaf.]

rotundifo'lia, (shin-leaf, pear-leaf wintergreen, w. J. ♃.) style declined; leaves rounded, or broad-oval, obsoletely serrulate, sub-coriaceous, shining; petiole about as long as the lamina; scape many-flowered. 6-12 i.

ellip''tica, (g-w. Ju. ♃.) leaves membranaceous, elliptical-ovate, serrulate, rather acute, lamina longer than the petiole; scape nearly naked; bracts subulate; calyx 5-toothed; style declined; scape 10 i.

asarifo'lia, (g-w. Ju. ♃.) leaves reniform, coriaceous, half as long as the dilated petiole; raceme many-flowered; stigma clavate; the disk elongated and 5-lobed. Dry woods.

secun''da, (one-sided wintergreen, g-w. Ju. ♃.) stamens erect; style straight; leaves ovate, acute; secund. 2-3 i. Sandy woods.

uniflo'ra, (J. ♃.) flower solitary; leaves orbicular, serrate; stigma acute; style straight, 5-toothed; flower terminal, large, white, fragrant, nodding. Chiefly in northern latitudes; rare.

aphyl''la, style declined; scape and stalk leafless, scaly; scales lanceolate, membranaceous; scape angular.

mi'nor, (w-r. Ju. ♃.) style straight; leaves round-oval, serrulate; scape sub-naked; spike with flowers reversed.

PY'RUS. 11—5. (*Rosaceæ.*) [Origin of the name doubtful.]

corona'ria, (crab-apple, w-r. M. ♄.) leaves broad-oval, at the base rounded, sub-angled or sub-lobed, serrate, smooth; peduncles corymbed. Flowers sweet-scented.

commu'nis, (pear, w. r. M. ♄.) leaves ovate, serrate, (rarely entire); peduncles corymbed. Ex.

ma'lus, (apple, w. r. M. ♄.) flowers in sessile umbels; leaves ovate-oblong, acuminate, serrate, glabrous; claws of the petals shorter than the calyx; styles glabrous. Var. *sylves''tris*, (wild-apple,) leaves ovate, serrate; fruit small, rough to the taste. The various kinds of apples are but varieties of the same species.

cydo'nia, (quince, w. J. ♂.) flowers solitary; fruit tomentose; leaves ovate, entire. Ex.

angustifo'lia, (M. ♄.) leaves lance-oblong, at the base acute, slightly crenate-toothed, shining; peduncles corymbed. Fruit very small. Florida.

prunifo'lia, (Siberian crab, w. r. M. ♄.) umbels sessile; pedicels pubescent; styles woolly at the base; leaves ovate, acuminate. 12-15 f.

spectab''ilis, (Chinese crab or garland flowering wild apple,) produces very showy flowers in May. Quite hardy. Ex.

corona'ria, (sweet-scented crab,) large and beautiful pink blossoms, very fragrant. Ex.

astracan''ica, (moscow or transparent crab,) fruit very large, wax-colored, almost transparent when ripe. Ex.

salvifo'lia, (w.) leaves woolly. Ex.

amyg''dalæfor''mis, leaves silvery-white, fruit shaped like that of the almond. Ex.

floribun''da, grows about four feet high, and sends down weeping branches, which are covered with a profusion of white flowers. Ex.

QUER''CUS. 19—12. (*Amentaceæ.*) [From *quero*, to inquire, because the Druids gave their divinations from this tree.]

1. *Fructification biennial; leaves setaciously mucronate.*

Leaves entire.

phel''los, (willow-oak, M. ♄.) leaves deciduous, linear-lanceolate, tapering at each end, very entire, glabrous, mucronate; acorn roundish. Var. *humil''is*, low and straggling; leaves shorter. 30-60 f.

imbrica'ria, (shingle-oak, M. ♄.) leaves deciduous, oblong, acute at each end, mucronate, very entire, shining-pubescent beneath; cup shallow; scales broad-ovate; acorn sub-globose. 40-50 f.

2. *Leaves dentate or lobed.*

trilo'ba, (downy black-oak, M. ♄.) leaves oblong-cuneiform, acute at the base, sub-3-lobed at the apex; lobes equal and mucronate, tomentose beneath; cup flat; acorn depressed-globose.

aquat''ica, (water-oak, M. ♄.) leaves obovate, cuneiform, glabrous, very entire; apex obscurely 3-lobed, middle lobe longest; cup hemispheric; acorn sub-globose; leaves very variable. 30-40 f.

ni'gra, (barren oak, blackjack, M. ♄.) leaves coriaceous, cuneiform, sub-cordate at the base, dilated, and retusely 3-lobed at the apex; when young, mucronate, glabrous above, rusty and pulverulent beneath; cup turbinate; scales obtuse and scarious; acorn short, ovate. Small.

cates''baei, (barren scrub-oak, M. ♄.) leaves short-petioled, cuneate at the base, oblong, deeply sinuate, glabrous; lobes 3-5, divaricate, dentate, acute; cup turbinate, large; scales obtuse, marginal ones inflexed; acorn ovate. 15—30 f. Bark used by tanners.

palus''tris, (pin-oak, M. ♄.) leaves long petioled, oblong, deeply sinuate, glabrous, axils of the veins villose beneath; lobes divaricate, dentate, acute; cup flat, smooth; acorn sub-globose.

tincto'ria, (black-oak, M. ♄.) leaves obovate-oblong, slightly sinuate, pubescent beneath; lobes oblong, obtuse, obscurely toothed, mucronate; cup flat; acorn depressed, globose; bark dark-colored.

banniste'ri, (scrub-oak,) leaves on long petioles, wedge-obovate, 3-5 lobed, entire on the margin, grayish-tomentose beneath; lobes setaceously mucronate; cup sub-turbinate; acorn sub-globose. Dry hills and barrens. 4-6 f.

ru'bra, (red-oak,) leaves large, bright green; sinuses rounded; cup of the corolla shallow, base flat.

coccin''ea, (scarlet-oak,) distinguished by the brilliant red of its leaves toward the close of autumn; acorn short, ovate; cup turbinate, scaly. The wood is used for cooper's staves.

3. *Fructification annual; fruit peduncled; leaves awnless, lobed.*

obtusilo'ba, (iron-oak, post-oak, M. ♄.) leaves oblong, sinuate, cuneate at the base, pubescent beneath; lobes obtuse, the upper dilated; cup hemispherical; acorn oval. 30-50 f.

al'ba, (white-oak, M. ♄.) leaves oblong, sinuate-pinnatifid, pubescent beneath; lobes obtuse, entire, narrowed at their bases, particularly on full-grown trees; fruit peduncled; calyx somewhat bowl-form, tubercled, flattened at the base; acorn ovate. Fertile forests throughout the U. S. Timber firm and durable, of great use in shipbuilding, and in many other arts. 70-100 feet high.

macrocar''pa, (over-cup oak, M. ♄.) leaves downy beneath, deeply lyrate, sinuate-lobed; lobes obtuse, repand, upper ones dilated; cup deep, upper scales setose; acorn short-ovate. A large tree.

olivæfor''mis, mossy-cup oak, M. ♄.) leaves oblong, smooth, glaucous beneath, deeply and unequally sinuate-pinnatifid; cup very deep, crenate above; acorn elliptic-oval. Hills. A large tree.

4. *Leaves entire, dentate.*

pri'nus, (swamp chestnut-oak, M. ♄.) leaves long petioled, obovate, acute, pubescent beneath, coarsely toothed; teeth dilated, callous at the point; cup deep, attenuate at the base; acorn ovate.

chin''quapin, (dwarf chestnut-oak, chinquapin, M. ♄.) leaves obovate, obtuse, glabrous, short-petioled, coarsely toothed, glaucous beneath; teeth nearly equal, dilated, callous at the apex; cup hemispheric; acorn ovate. A low shrub. 3-4 f.

monta'na, (rock chestnut-oak, M. ♄.) leaves petioled, broad-obovate, oblong, white-tomentose beneath, shining above, coarsely toothed, obtuse and unequal at the base; teeth nearly equal, very obtuse; fruit in pairs, short-peduncled; cup hemispheric, scales tuberculate, rugose; acorn ovate. 30-50 f.

casta'nea, (yellow-oak, M. ♃.) leaves long-petioled, lance-oblong, obtuse at base, acuminate, tomentose beneath, coarsely toothed; teeth unequal, dilated, acute, callous at the apex; cup hemispheric; acorn ovate, sub-globose. Mountains. 60-70 f.

bi'color, (swamp white-oak, M. ♄.) leaves short-petioled, oblong, obovate, white tomentose beneath, coarsely toothed, entire at the base; teeth unequal, spread, acutish, callous at the apex; fruit in pairs, long-peduncled; cup hemispheric; acorn oblong-ovate. Var. *mol''lis*, leaves toothed, sub-ferruginous and soft-pubescent beneath. 60-70 f. *S.*

vir''ens, (live-oak, M. ♄.) leaves perennial, coriaceous, oblong-oval, entire, margins revolute, obtuse at base, acute at the apex, stellate-pubescent beneath; fruit pedicelled; cup turbinate, acorn oblong. 40-60 f Florida.

pu'mila, (Ap. ♄.) leaves deciduous oblong-lanceolate, sub-undulate, acute and mucronate at the apex, glabrous above tomentose beneath; acorn nearly spherical. 2 f. *S.*

mariti'ma, (Ap. ♄.) leaves perennial, coriaceous, lanceolate, entire, glabrous, tapering at the base, acute at the apex, mucronate; acorn oval. 4-10 f. *S.*

hemispher''ica, (M. ♄.) leaves perennial, lance oblong, undivided. 3-lobed, and sinuate; lobes mucronate, glabrous on both sides. Resembles the *aquat''ica*. *S.*

laurifo'lia, (Ap. ♄.) leaves nearly perennial, sessile, lance-oblong, sub-acute, tapering at the base, entire, glabrous on both sides; acorn sub-ovate. Var. *obtu'sa*, leaves obtuse at the apex. 40-50 f. *S.*

cine'rea, (Ap. ♄.) leaves perennial, coriaceous, oblong-lanceolate, entire, margins sub-revolute, mucronate at the apex, stellate, tomentose beneath; fruit sessile; acorn sub-globose. 20 f. *S.*

myrtifo'lia, (♄.) leaves perennial, coriaceous, small, oblong-ovate, acute at each end, glabrous, shining and reticulate above margins revolute. *S.*

na'na, (♄.) leaves cuneate, glabrous, 3 lobed at the summit, sub-sinuate at the base; lobes divaricate, mucronate; middle one largest; axils of the veins beneath pubescent; acorn ovate, sub-globose. *S.*

michaux''ii, (Ap. ♄.) leaves petioled, obovate, obtuse at the base, unequally dentate sinuate, tomentose beneath; fruit generally in pairs; acorn very large, ovate. 50-60 f. *S.*

lyra'ta, (Ap. ♄.) leaves glabrous, sinuate, oblong; lobes oblong, sub-acute, upper ones broad, angled; cup as long as the globose nut; acorn nearly covered. 60-70 f. *S.*

i'lex, (evergreen oak,) a very ornamental shrub. Ex.

lucumbea'na, (turkey-oak,) grows rapidly, and forms a very handsome pyramidal tree Ex.

RANUN''CULUS 12—12. (*Ranunculaceæ.*, [Diminutive of *rana*, a frog, because it is found mostly in places where frogs abound.]

A. *Leaves divided.*

abor''tivus, (y. M. ♃.) glabrous; stem striate, naked below; radical leaves heart reniform, obtusely crenate, cauline ones petioled, ternate, angled, upper ones sessile, branches about 3-flowered. 9-15 i.

re'pens, (y. M. ♃.) pubescent; leaves ternate, 3-cleft, gashed; creeping shoots sent off in the summer; peduncles furrowed; calyx spreading. Damp.

a'cris, (crowfoot, buttercup, y. M. ♃.) hairs close-pressed; leaves 3-parted, many-cleft, upper ones linear; peduncles terete; calyx spreading. 1-2 f.

scelera'tus, (celery crowfoot, y. Au. ♃.) radical leaves petioled, 3-parted, the segments lobed, cauline ones sessile, 3-lobed, carpels small, numerous, forming an oblong head; stem 1 f., succulent, branched.

his''pidus, (hairy crowfoot, w-y.) stem and petioles with stiff, spreading hairs; calyx hairy; styles short. Wet ground *recurva'tus*, calyx and corolla recurved; carpels uncinate; stem erect; petioles covered with stiff, spreading hairs. Shady woods.

fluvia'tilis, (river-crowfoot, w. y. M. ♃.) stem submersed; leaves dichotomous, capillary.

bulbo'sus, (y. M. ♃.) very hirsute; leaves ternate, 3-cleft, gashed and toothed; stem erect, many-flowered; petals obcordate, shorter than the reflexed sepals; root bulbous.

pennsylva'nicus, (y. Au. ♃.) stem pilose, erect, branching; leaves ternate, villose; segments sub-petiolate, acutely 3-lobed, incisely serrate; calyx reflexed; petals about equalling the calyx; styles of the fruit straight. 1-2 f.

hirsu'tus, (pale buttercup, y. Ju. ♃.) hirsute; leaves ternate; stem erect, many-flowered; peduncles sulcate; calyx reflexed; fruit globose; carpels tubercled; root fibrous. Wet fields.

clinto'nii, (y. M. ♃.) leaves ternate, hairy; leafets toothed and incised, cuneate, terminal ones petioled, floral leaves incised or linear; peduncle 1-3 flowered; petals rounded; calyx spreading; carpels margined, with a short, uncinate style. 6-8 i.

lanugino'sus, (y. J. ♃.) hirsute; leaves 3-cleft, lobed, dentate; whole plant silky; peduncles elongated, terete; calyx spreading.

aquat″ilis, (water crowfoot, w. Ju. ♃.) stem floating; leaves submersed, divided into capillaceous segments; petals obovate-oblong, longer than the calyx. Var. *heterophyl″lus*, immersed leaves 3-parted. Var. *capilla'ceus*, leaves petioled, all immersed, and filiformly dissected. Var. *cespito'sus*, leaves petioled, all immersed; base of the petiole broad-sheathing and auricled. Var. *stagna'lis*, leaves sessile, all immersed, filiformly dissected, circinate; segments short; carpels rather acute, nearly smooth.

maryland″icus, (w-y. M. ♃.) pubescent; stem simple, sub-naked; radical leaves ternate; leafets 3-lobed; lobes acute, gashed; calyx reflexed.

hedera'ceus, (Ju. ♃.) stem creeping; leaves sub-reniform, about 3-5 lobed; lobes broad, entire, very obtuse; petals oblong, scarcely longer than the calyx; stamens 5-12, carpels glabrous. *S.*

echina'tus, (y.) simple, rather glabrous; leaves roundish, 3-lobed; petals twice as long as the calyx. *S.*

tomento'sus, (y. ♃.) stem ascending, very villose, 1-2 flowered; leaves petioled, tomentose, 3-cleft, upper ones sessile, ovate, entire; calyx very villose, sub-reflexed. *S.*

carolinia'nus, (y.) stem erect, branched, and with the petioles appressed, pubescent; leaves glabrous, 3-cleft or 5-lobed; lobes ovate, somewhat gashed, toothed; calyx glabrous, reflected, a little shorter than the petals, *S.*

trachysper″mus, (y. M.) stem, petiole, and leaves, villose, with the hair spreading; leaves 3-cleft; lobes acutely gashed; peduncles short, opposite the leaves; carpels tubercled, with the point hooked. 12-15 i *S.*

murica'tus, (y. Ap. ☉.) leaves petioled, glabrous, roundish, 3-lobed, coarsely toothed; stem erect or diffuse; peduncles opposite the leaves; calyx spreading; carpels rough-tubercled on both sides, with a straight-acuminate point. 12-18 i. *S.*

B. *Leaves undivided.*

lin″gua, (great spearwort, y. Au. ♃.) leaves long, lanceolate, serrate, semi-amplexicaulis; stem erect, smooth, many-flowered; flowers large. Banks of streams 2-3 f.

flammu'la, (spearwort, y. Ju.) leaves glabrous, lance-linear, lower ones petioled; stem decumbent, rooting; peduncles opposite the leaves; flowers smaller than the preceding. Swamps. 12-18 i.

pusil″lus, (y. Ju. ♃.) erect; leaves petioled, lower ones ovate, upper ones lance oblong; petals about as long as the calyx. 6-12 i.

rep″tans, (w-y. Ju. ♃.) leaves linear-subulate; stems filiform, creeping, geniculate; joints 1-flowered. 6-10 i.

nemoro'sus, produces yellow flowers from May to August. Ex.

illyr″icus, remarkable for its silky, white leaves. Ex.

plantagin″eus, (Ap. w.) leaves glaucous lanceolate.

RAPHA'NUS. 14—2. (*Cruciferæ.*) [From *radios*, root, *phainesthai*, to grow quickly.]

sati'vus, (garden radish, w. J. ☉.) leaves lyrate; silique terete, torose, 2-celled There are several varieties of this species—one has a fusiform, another a globose, another a black root. Ex.

raphanis″trum, (wild radish, y. Au.) leaves simple, lyrate; pod jointed, 1-celled, striate, 3-8 seeded. 1-2 f. Stem hispid. Fields.

RENSSELAE'RIA. 19—12. (*Aroideæ.*) [In honor of Gen. Stephen Van Rensselaer, of Albany, N. Y.]

virgin″ica, (g. J. ♃.) scapes several from one root; leaves on long petioles, oblong, hastate-cordate, with the lobes obtuse, a foot or more long; spatha lanceolate, involute, border undulate, closely embracing the spadix, which is long and slender; berries 1-seeded. 12-18 i.

RESE'DA. 12—5. (*Capparides.*) [From *resedo*, to appease, so called from its supposed virtues in allaying inflammation.]

odora'ta, (mignonette, w-y. Ju. ☉.) leaves entire and 3-lobed; calyx equalling the corolla. Ex.

luteo'la, (dyer's weed, y.) leaves lanceolate, undulate, entire, each side of the base toothed; calyx 4-cleft; flowers in a spike. Introduced.

micran″thus, (y.) hairy; leaves petiolate, somewhat rhombic-ovate, crenate, some 3-parted or 3-cleft, cauline ones sub-sessile, with 3-5 linear-oblong segments; sepals with a broad, membranaceous border, as long as the corolla. Ex.

RHAM″NUS. 5—1. (*Rhamni.*) [From *raio*, to destroy, on account of the many thorns of some of its species.]

alnifo'lius (dwarf-alder, w-g. M. ♄.) unarmed, leaves oval, acuminate, serrulate, pubescent on the nerves beneath; flowers diœcious; peduncles 1-flowered, aggregate; calyx acute; fruit turbinate; berries black. Rocky hills.

cathar''ticus, (buckthorn, y-g. ♄.) branches spiny; leaves opposite, ovate; flowers 4-cleft, diœcious. Mountain woods.

franguloi'deus, (w-g. M. ♄.) unarmed; leaves oval, acuminate, serrulate, pubescent at the nerves beneath; peduncles aggregate, 1-flowered; calyx acute; fruit turbinate; berries black.

carolin''ia'nus, (w. J. ♄.) unarmed; leaves alternate, oval-oblong, sub-entire, ribbed, glabrous; umbels peduncled; flowers all fertile; berry black, globose. 4-6 f.

lanceola'tus, (♄.) unarmed; leaves nearly opposite, oval, serrulate; flowers very minute, divisions spiked, alternately sessile on the rachis; style 3-cleft; berries 3-seeded.

parvifo'lius, unarmed; leaves ovate, serrulate, when young, pubescent, acute, or emarginate; flowers solitary, or 2 to 3 together, axillary, short-pedicelled, tetandrous; petals minute, 2-lobed, partly surrounding the very short stamens; styles 2, united below, very short and conical. *S.*

minutiflo'rus, (Oc. ♄.) unarmed; leaves nearly opposite, oval, serrulate; flowers very minute, divisions spiked, alternately sessile on the rachis; style 3-cleft; berries 3-seeded.

RHE'UM. 9—3. (*Polygonæ.*) [From *Rha*, an ancient name of the Wolga, on whose banks it was discovered.]

palma'ta, (rhubarb, J. ♃.) leaves palmate, acuminate. Ex.

rhapon''ticum, (pie rhubarb, w. J. ♃.) leaves heart-ovate, obtuse and acute, smooth; veins sub-pilose beneath, the sinuses at the base dilated; petioles furrowed on the upper side, rounded at the edge; radical leaves very large. 2-4 f. Ex.

RHEX''IA. 8—1. (*Melastomiæ.*)

maria'na, (w-r. Ju. ♃.) very hairy; leaves lanceolate, acute at each end, 3-nerved, sub-petiolate; calyx tubular, nearly smooth. Var. *purpu'rea*, has purple flowers; petals obovate, hairy on the outer surface.

virgin''ica, (deer-grass, meadow-beauty, p. Ju. ♃.) stem with winged angles, square, somewhat hairy; leaves sessile, ovate-lanceolate, ciliate, serrate, 3-7 nerved, sprinkled with hairs on both sides; corymbs dichotomous. Wet meadows. 1 f.

cilio'sa, (p. Ju. ♃.) stem nearly square, smooth; leaves sub-petioled, oval,serrulate, ciliate, 3-nerved, glabrous beneath, slightly hispid above; flowers involucred. 12-18 i.

glabel''la, (deer-grass, p. Ju.) glabrous, stem terete; leaves lanceolate and ovate, 3-nerved, denticulate, slightly glaucous; calyx glutinous. 2-3 f. *S.*

serrula'ta, (p. ♃.) stem nearly square, glabrous; leaves small, sub-petioled, roundish-oval, acute, smooth on both sides, margin serrulate, base sub-ciliate; flowers peduncled, about in threes; calyx glandular-hirsute. 6-10 i. *S*

lu'tea, (y. Ju. ⊙.) hirsute; leaves linear lanceolate, sometimes wedge-form at the base, 3-nerved; panicle pyramidal; anthers erect, terminal. 18 i. *S.*

angustifo'lia, (w. Ju. ♃.) anthers incumbent; leaves linear and lance-linear, somewhat clustered; plant hirsute. *S.*

stric''ta, (p. J. ♃.) stem 4 angled, straight winged, glabrous, bearded at the joints leaves sessile, narrow-lanceolate, acuminate, 3-nerved, glabrous on both sides; corymb dichotomous. *S.*

linearifo'lia, (y.) stem cylindrical, subpubescent; leaves alternate, linear, oblong, obtuse, sessile, pubescent on both sides, flowers generally solitary. *S.*

RHINAN''THUS. 13—2. (*Pediculares.*) [From *rin*, nose, and *anthos*, flower.]

cristagal''li, (yellow-rattle, y. J. ⊙.) upper lip of the corolla arched; calyx smooth; leaves lanceolate, serrate, opposite; flowers axillary, somewhat spiked, yellow Meadows.

RHIZOPHO'RA. 12—5. (*Salicariæ.*) [From *rhizo*, root, and *phero*, to bear, on account of its peculiar root.]

man''gle, (mangrove, ♄.) leaves acute ovate, opposite; peduncles axillary; fruit clavate, subulate.

RHODODEN''DRON. 10—1. (*Rhododendra.*) [From *rodon*, a rose, *dendron*, tree; so called because it resembles the rose.]

max''imum, (wild rosebay, E. r. Ju. ♄.) leaves oblong, glabrous, paler beneath umbels terminal, dense; corollas somewhat bell-form. Var. *rose'um*, corolla pale rose-color; segments roundish; leaves obtuse at the base. Var. *al''bum*, corolla smaller, white, segments oblong; leaves acute at the base. Var. *purpu'reum*, corolla purple; segments oblong; leaves obtuse at the base, green on both sides. 4-20 f

pon''ticum, (rosebay, p. ♄.) leaves oblong, glabrous, both sides colored alike; corymbs terminal; corolla bell-wheel-form; petals lanceolate. A native of Asia Minor.

lappon''icum, (p. Ju. ♄.) flowers in terminal, leafy clusters, campanulate; stamens mostly 8; leaves elliptical, punctured, coriaceous, evergreen; shrub 8-10 i. White hills.

albiflo'rum, (w. ♄.) erect; leaves deciduous, lance-oval, very entire, membranaceous, glabrous, fasciculate in the apex of the branches; peduncles fasciculate, lateral and terminal; calyx sub-foliaceous, hispid corolla rotate-campanulate; stamens 10 erect, equal. 2-3 f.

puncta'tum, (r. Ju. ♄.) leaves oval, lanceolate, glabrous, with resinous dots beneath umbels terminal; corolla funnel-form; capsules long. 4-6 f. *S.*

catawbien''se, (r. J. ♄.) leaves short-oval, glabrous, roundish-obtuse at each end; umbels terminal; segments of the calyx narrow-oblong; corolla campanulate. 3-4 f *S.*

arbo'reum, grows about 20 feet high with immense bunches of dark scarlet or crimson velvet-like flowers. These flowers secrete honey in such abundance, that when the tree is shaken, the drops of honey fall from it like rain. The leaves are large and silvery beneath.

chrysan″thum, a dwarf species, with yellow flowers. Ex.

RHODO′RA. 10—1. (*Rhododendra.*)

canaden″sis, (false honeysuckle, p. M. ♄.) leaves alternate, oval, entire, pubescent-glaucous beneath; flowers in terminal umbels or clusters, appearing before the leaves. Mountain bogs. 2 f.

RHUS. 5—3. (*Terebintaceæ.*) [From *reo,* to flow, so called because it was supposed to be useful in stopping hæmorrhages.]

gla′brum, (sleek-sumach, g. r. Ju. ♄.) branches, petioles, and leaves. glabrous; leaves pinnate, many-paired; leafets lance-oblong, serrate, whitish beneath; fruit silky. The leaves are used for tanning morocco leather. Berries red and sour. 6-12 f.

ver″nix, (poison-sumach, y-g. J-Ju. ♄.) very smooth; leaves pinnate; leafets in many pairs, oval, abruptly acuminate, entire; panicles loose; flowers diœcious. A small tree.

toxicoden″dron, (g-y. J–Ju. ♄.) stem erect; leaves ternate; leafets broad, oval, entire or sinuate, dentate, sub-pubescent beneath; flowers diœcious, in sessile, axillary racemes. 1-3 f. Var. *rad″icans* (poison-ivy), stem climbing.

typhi′na, (stag's-horn sumach, y-g. J. ♄.) branches and petioles very villose; leafets in many pairs, lance oblong, acuminate, acutely serrate, pubescent beneath; flowers in oblong, dense panicles, diœcious; clusters of fruit covered with a purple, velvety down; berries red, and very sour. Rocky hills.

copalli′num, (gum-copal tree, mountain sumach, y-g. Ju. ♄.) petioles winged, appearing as if jointed; leafets many-paired, oval-lanceolate, very entire, shining on the upper surface; panicle sessile; flowers diœcious. Fruit red, hairy, small.

aromat″icum, (y. M. ♄.) leafets sessile, ovate-rhomboid, dentate, pubescent beneath; flowers amentaceous, diœcious. 2-6 f. Mountains.

pu′milus, (Ju. ♄.) low; branches and petioles pubescent; leafets oval, sharply toothed, tomentose beneath; fruit silky and downy. Poisonous. 1 f. *S.*

lauri′num, very glabrous; leaves elliptical or elliptic-ovate, obtuse or emarginate, often mucronate; panicles crowded; stamens 5; filaments very short. California.

co′tinus, (purple fringe-tree, p-g. Ju. ♄.) leaves simple, obovate and ovate; panicled racemes plumose. A small tree, with very minute flowers supported on capillary, downy, or hairy peduncles. Indigenous in Siberia, Austria, and Lombardy, often called the periwig-tree from the curious appearance of the seed-vessels which look like a powdered wig. Ex.

vernicife′ra, (varnish or Japan sumach,) a native of India and Japan, where it is much esteemed on account of its gum, which forms the best varnish.

RHYNCHOS″PORA. 3—1. (*Cyperoideæ.*) [From *runchos,* the beak of a bird, and *spora,* a seed, the permanent style forming a beak to the seed.]

al″ba, (Ju. ♃.) spike corymb-fascicled; culm triangular above; leaves setaceous; pericarp somewhat lenticular; bristles about 10. 12-18 i.

glomera′ta, (false bog-rush, J. ♃.) spikes clustered in corymbs, distant, by pairs; stem obtusely angled; pericarp obovate, wedge-form, very glabrous. 12-18 i.

rariflo′rus, (M. ♃.) stem and leaves setaceous; panicle loose, few-flowered; seed obovate, rugose; bristles as long as the seed. 1 f. *S.*

inexpan″sa, (Ju.) stem obscurely 3-angled; panicles remote, pendulous; seed oblong, compressed, rugose; bristles scabrous, twice as long as the seed. 2 f. *S.*

dis″tans, (Ju.) stem 3-angled; flowers in distant clusters; seed lenticular, slightly furrowed; bristles setaceous. 12-20 i. *S*

puncta′ta, fascicles lateral and terminal, clustered near the summit of the stem; seeds rugose, dotted, shorter than the bristles. 1-2 f. *S.*

RI′BES. 5—1. (*Cacti.*) [Origin of the name doubtful.]

flo′ridum, (wild black-currant, M. ♄.) unarmed; leaves punctate both sides; racemes pendent; calyx cylindric; bracts longer than the pedicels. 3-4 f.

triflo′rum, (wild gooseberry, g. M. ♄.) spine sub-axillary; leaves glabrous, 3-5-lobed, gash-toothed; peduncles sub-3-flowered; pedicels elongated; bracts very short; petals spatulate, undulate; style hirsute, half 2 or 3-cleft, exsert, berry glabrous, pale red. 3-4 f.

ru′brum, (currant, g. M. ♄.) unarmed, racemes glabrous, nodding; corolla flat; petals obcordate; leaves obtusely 5-lobed; stem erect; berries red. 2-4 feet. Ex.

ni′grum, (black currant, g. M. ♄.) unarmed; leaves punctate beneath; racemes lax; flowers bell-form; bracts shorter than the pedicels; berries black. 5-3 f. Ex.

grossula′ria, (English gooseberry, g. M. ♄.) branches prickly; petioles hairy; bracts 2-leaved; berry glabrous or hirsute. 2-4 f. Ex.

albiner′vium, (g-y. M. ♄.) leaves short, acutely lobed, smoothish; nerves white, racemes recurved; berries red, smooth.

tri′fidum, (y-g. M. ♄.) leaves moderately lobed, smooth above, pubescent beneath, racemes lax, pubescent; flowers rather flat; segments of the calyx about 3-cleft, petals spatulate, obtuse; berries hairy, red

ri′gens, (mountain currant, M. ♄.) unarmed; branches straight; leaves long-petioled, acutely lobed and dentate, reticulate-rugose, pubescent beneath; racemes lax; becoming stiffly erect; segments of the calyx obovate, obtuse; berries red, hispid.

glandulo′sum, (r-y.) branches prostrate; leaves lobed, smoothish; younger ones pubescent; racemes sub-erect; petals deltoid; bracts minute; berry hispid, most of the plant, particularly the calyx, covered with glandular hairs. 2-3 f.

gra'cile, (M. ♄.) spines sub-axillary; leaves on slender petioles, pubescent on both sides; lobes acute, dentate, incised; peduncles slender, erect, about 2-flowered; calyx tubular-campanulate; berries glabrous. 2-3 f.

oxycanthoi'des, (smooth gooseberry, M. ♄.) larger spines sub-axillary; smaller ones scattered; leaves glabrous; lobes dentate; peduncles short, about 2-flowered; berries purple, glabrous. 3 f.

cynos''bati, (prickly gooseberry, g. M. ♄.) sub-axillary spines by pairs; leaves short-lobed, gash-toothed, soft, pubescent; racemes nodding, few-flowered; calyx erect, campanulate; berries aculeate, dark brown.

resino'sum, (g. Ap. ♄.) unarmed, covered with resinous, glandular hairs; leaves 3-5-lobed, roundish; racemes erect; calyx flattish; petals obtuse-rhomboid; bracts linear, longer than the pedicels; berries hirsute. *S.*

rotundifo'lium, (♄.) spines sub-axillary; leaves roundish, lobes obtuse; peduncles 1-flowered; limb of the calyx tubular; berries glabrous. *S.*

ni'veum, (snowy-flowered gooseberry,) has pendulous white flowers, and dark purple fruit. Ex.

specio'sum, (fuschia-flowered gooseberry,) flowers scarlet, stamens very long; leaves sub-evergreen.

puncta'tum, an evergreen species, a native of Chili; flowers bright yellow; leaves shining.

RICI'NUS. 19—15. (*Euphorbiæ.*) [From *rin*, nose, and *kunos*, a dog, because the capsules stick to the noses of dogs.]

commu'nis, (castor-oil plant, palma-christi, ⊙.) leaves peltate, palmate; lobes lanceolate, serrate; stem with hoary mealiness. 4-6 f. Ex.

RIVI'NA. 4—1. (*Atriplices.*) [In honor of *Rivinus*, the great German botanist.]

læ'vis, leaves ovate, acuminate, glabrous, flat; stem terete; racemes simple.

hu'milis, (♄.) racemes simple; leaves tetandrous; leaves pubescent. *S.*

ROBIN''IA. 16—10. (*Leguminosæ.*)

pseudo-aca'cia, (locust-tree, false acacia, w. M. ♄.) leaves pinnate, with a terminal leafet; stipules thorny, or a thorn; racemes pendent; teeth of the calyx unawned; legumes smooth. 30-40 f.

visco'sa, (clammy locust, Ju. ♃.) racemes of one-flowered pedicels; pinnate leaves with a terminal leafet; branches and legumes viscid; racemes axillary, dense-flowered, erect; flowers varying from red to white. *S.* Cultivated.

his'pida, (rose-locust, Au. r. ♄.) racemes axillary; calyx acuminate; most of the plant hispid; leaves pinnate with a terminal leafet; leafets round-oval, mucronate, sometimes alternate. 3-6 f. *S.* Cultivated.

ROCHEL''IA. 5—1. (*Boragineæ.*)

virginia'na, (w. b. J. ⊙.) pilose, leaves oblong-lanceolate, acuminate, large, scabrous above; racemes divaricate; fruit densely covered with hooked bristles. 2 f. Rocky hills

lap''pula, (b. Ju. ⊙.) leaves linear-oblong; stem branched above; corolla longer than the calyx; border erect-spreading 12-18 i.

RO'SA. 11—12. (*Rosaceæ.*) [The Latin name rosa, is from the Greek *rodon*, red.]

parviflo'ra, (wild-rose, r. w. ♄.) germs depressed, globose; germs and peduncles hispid; petioles pubescent, sub-aculeate stem glabrous; prickles stipular, straight; leafets lance-oval, simply serrate, glabrous, flowers somewhat in pairs; very variable. 1-3 f.

rubigino'sa, (sweet-brier, eglantine, r. J ♄.) germ ovate; peduncles and petioles glandular, hispid; petioles somewhat prickly; stem glabrous; prickles scattered, hooked, slender; leafets (5 or 7) ovate, serrate, sub-glandular beneath. 3-4 f.

corymbo'sa, (swamp-rose, r-w. Ju. ♄.) flowers 5-7, in terminal corymbs; petals large, obovate, emarginate; petioles tomentose.

lu'cida, leafets 5-9, lanceolate-elliptic, coriaceous, shining; stipules large, serrulate; peduncles somewhat hispid; segments of the calyx entire, spreading; flowers mostly in pairs. Mountain swamps. 3-4 f The American species of this genus are not, generally, well defined.

cani'na, (dog-rose, ♄.) germs ovate, germs and peduncles glabrous; stem and petioles prickly; leaves ovate, glabrous. Ex.

gal''lica, (French-rose, common rose, r. J. ♄.) germs ovate; germs and peduncles hispid; stem and petioles hispid-prickly. Sometimes the colors are variegated. Ex.

damasce'na, (damask-rose, w. r. J. ♄.) calyx half pinnate; germ ovate, turgid, (thickened near its top,) bristly; stem and petioles prickly; leafets ovate, pointed, downy beneath. Ex.

gemel''la, (r. Ju. ♄.) stipular prickles uncinate, in pairs; leafets 5-7-oblong, acute, opaque, pubescent beneath; flowers somewhat in pairs; fruit depressed-globose, with the peduncles glabrous. Dry hills.

sabifo'lia, (climbing rose, r. Ju. ♄.) tube of the calyx sub-globose; with the peduncles glandular-hispid; stem smooth; prickles short, solitary, uncinate; leaves petioled, ternate; leafets ovate, acute, serrate, glabrous above, white, downy beneath; segments of the calyx viscid-pilose; flowers corymbed. 6-8 f.

micran''tha, (r-w. J. ♄.) tube of the calyx ovate, with the peduncles somewhat hispid; prickles hooked; leafets ovate, acute, with reddish glands beneath. 4-8 f.

pimpinel''lifo'lia, (burnet rose, r. ♄.) leaves obtuse, petioles scabrous; peduncles glabrous; stem with straight prickles scattered. Very small. Ex.

parvifo'lia, (small-leaf rose, ♄.) small tube of the calyx ovate, sub-glabrous; peduncles glandular; stem and petioles with slender prickles; leafets rugose; a little villose beneath, ovate, glandular, serrate.

setige'ra, (J. ♄.) fruit globose, with the petioles and veins prickly; branches glabrous; prickles by pairs and scattered; leaf ets 3-5, acuminate, glabrous; leafets of the calyx feathered with bristles. 5-8 f. *S.*

læviga'ta, (Cherokee rose, w. Ap. ♄.) fruit oblong, hispid; leaves perennial, ternate; leafets lanceolate, serrate, lucid, coriaceous; flowers solitary, terminal. 5-20 f. *S.*

lutes″cens, (y-w. J. ♄.) fruit globose, and with the peduncles glabrous; branches hispid-spiny; leafets (7) glabrous, oval; petioles unarmed; flowers solitary; segments of the calyx lanceolate, cuspidate; petals oval, very obtuse. *S.*

musco'sa, (moss-rose, r. Au. ♄.) germs ovate; calyx, peduncles, petioles, and branches, hispid, glandular-viscid, (moss-like); spines of the branches scattered, straight. Ex.

moscha'ta, (musk-root, ♄.) germs ovate; germs and peduncles villose; stem and petioles prickly; leafets oblong, acuminate, glabrous; panicle many-flowered. Ex.

burgundia'ca, (Burgundy-rose, ♄.) germs sub-globose; germ and peduncles hispid; leafets ovate, pubescent beneath; corolla small, full, fleshy, white; disk obscure. Var. *provincia'lis,* has scattered, reflexed prickles on the branches, and glandular serratures. Ex.

semperflo'rens, (monthly-rose, ♄.) germs ovate-oblong, tapering to both ends; germs and peduncles hispid; stem prickly; flowers in erect corymbs. Resembles damascena. Ex.

al″ba, (white-rose, w. J. ♄.) germs ovate, glabrous or hispid; stem and petioles prickly; leafets ovate, villose beneath. Ex.

centifo'lia, (hundred-leaved rose, r. ♄.) germs ovate; germs and peduncles hispid; stem hispid, prickly; leaves pubescent beneath; petioles unarmed. Ex.

cinnamo'mea, (cinnamon-rose, ♄.) germs globose; germs and peduncles glabrous; stem with stipular prickles; petioles somewhat unarmed; leafets oblong. Stem brown, cinnamon-color. Ex.

multiflo'ra, (Japan-rose, ♄.) germs ovate; germs and peduncles unarmed, villose; stem and petioles prickly. Branches generally purple; leafets ovate; flower small, panicled. Ex.

spinosis″sima, (Scotch-rose, ♄.) germs globose, glabrous; peduncles hispid; stem and petioles very hispid. Var. *scot″ica,* is smaller. Loudon says that there are 300 varieties of this rose in a nursery at Glasgow; and that florists enumerate upwards of 900 sorts of roses. Ex.

ROSMARI'NUS. 2—1. (*Labiatæ.*) [From *ros,* dew, and *marinus,* of the sea.]

officina'lis, (rosemary, ♄.) some leaves are green both sides; others whitish beneath, linear; margins revolute. Ex.

ROTBOL″LIA. 3—2. (*Gramineæ.*) [In honor of Rotboll, professor of botany at Copenhagen.]

dimidia'ta, (hard grass, ♃.) spike compressed, linear; flowers secund; glumes 2-flowered; outer floret staminate; inner one perfect. *S.*

cilia'ta, culm erect, tall; spikes terete, long-peduncled; flowers pedicell secund; margins and pedicels of the his villose; glumes and paleas each 2. 3-4 f *S.*

RU'BIA. 4—1. (*Rubiaceæ.*) [From *ruber,* red; on account of the color of its roots.]

tincto'ria, (madder,) leaves lanceolate, about in sixes; stem prickly, climbing. Var. *sylves″tris,* lower leaves in sixes, upper ones in fours, or in pairs. Ex.

brown″ii, (y. ♃.) hispid; leaves by fours, oval; peduncles solitary, single-flowered; stem decumbent. Berries purple, smooth. *S.*

RU'BUS. 11—12. (*Rosaceæ.*) [From *ruber,* red, on account of the color of its fruit.]

ide'us, (garden raspberry, w. M. ♄.) leaves quinate-pinnate and ternate; leafets rhomb-ovate, acuminate, downy beneath; petioles channeled; stem prickly, hispid; flowers sub-panicled. Var. *america'nus,* branchlets nearly glabrous; stem and petioles terete; leaves all ternate; pedicels somewhat prickly. 4-6 f.

villo'sus, (high blackberry, w. J. ♄.) pubescent, hispid, and prickly; leaves digitate, in threes or fives; leafets ovate, acuminate, serrate, hairy both sides; stem and petioles prickly; calyx short, acuminate; racemes naked; petals lance-ovate. 4-6 f.

strigo'sus, (red raspberry, w. J. ♄.) unarmed, rigidly hispid; leafets 3, or pinnate-quinate, oval, at the base obtuse, acuminate, marked with lines, and white-downy beneath, terminal one often sub-cordate fruit red, sweet.

occidenta'lis, (black raspberry, w. g. ♄.) branches and petioles glaucous and prickly; leaves ternate, oval, acuminate, sub lobate and doubly serrate, white-downy beneath; petioles terete; prickles recurved. 4-8 f.

trivia'lis, (creeping blackberry, dewberry, w. J. ♄.) sarmentose-procumbent; petioles and peduncles aculeate, hispid, with the prickles recurved; stipules subulate; leaves ternate or quinate, oblong-oval, acute, unequally serrate, sub-pubescent, pedicels solitary, elongated. Var. *flagella'ris,* has orbicular petals, and small, smooth leaves.

odora'tus, (flowering raspberry, r. J. ♄.) unarmed, erect, viscid; hispid leaves simple, acutely 3-5-lobed; corymbs terminal, spreading; flowers large; berries rather dry and thin. 3-6 f.

frondo'sus, (leafy raspberry, J. ♃.) stem erect, prickly; leaves ternate or quinate pubescent, simple; racemes leafy; upper flowers opening first; petals orbicular. 3 6 f. Road-sides.

seto'sus, (bristly raspberry, w-r. J. ♃.) stem erect, reclining, rigidly hispid; leaves ternate or quinate, smooth and green on both sides.

his″pidus, (w. J. ♄.) sarmentose-procumbent; stem, petioles, and peduncles, strongly hispid; leaves ternate, gash-serrate, naked, middle one pedicellate. Berries black, large.

canaden″sis, (J. ♄ stem purple, smooth ish; leaves digitate, in tens, fives, and threes; leafets lanceolate, acutely serrate, naked on both sides; stem unarmed; bracts lanceolate; pedicels elongated, 1-3-flowered; calyx 5-7-cleft.

obova'lis, (M. ♃.) stem becoming a little woody, hispid with stiff hairs; leaves ternate; leafets round-obovate, serrate, naked; stipules setaceous; racemes sub-corymbed, few-flowered; bracts ovate; pedicels elongated. 2-4 f.

cuneifo'lius, (w. J. ♄.) branches, petioles, and peduncles, pubescent; prickles few, recurved; leaves ternate and quinate, palmate; leafets cuneate-obovate, entire at the base, sub-plicate, tomentose beneath; racemes loose; pedicels solitary, 1-flowered. 2-3 f.

stella'tus, (p. ♃.) herbaceous, small; stem unarmed, erect, 1-flowered; leaves simple, cordate, 3-lobed, rugose-veined; petals lanceolate.

chamæmo'rus, (cloud-berry, w. J. ♃.) herbaceous, small; stem unarmed, 1-flowered, erect; leaves simple, sub-reniform, with rounded lobes; petals oblong. Canada.

peda'tus, (♃.) small, herbaceous, creeping; leaves pedate-quinate, gashed; peduncles filiform, bracted in the middle; calyx nearly glabrous, reflexed.

RUDBECK″IA. 17—3. (*Corymbosæ.*) [In honor of two botanists of the name of Rudbeck, who lived in the 17th century.]

purpu'rea, (p. Ju. ♃.) very rough; lower leaves broad-ovate, alternate at the base, remotely toothed, cauline ones lance-ovate, acuminate at each end, nearly entire; ray-florets very long, deflected, bifid. High grounds. Stem 3-4 f. Ray purple; disk brown; involucrum imbricate.

ful″gida, (y. Oct. ♃.) stem hispid, branches long, virgate, and 1-flowered; leaves lance-oblong, denticulate, hispid; scale of the involucrum as long as the ray; ray-florets 12-14, 2-cleft at the summit; stem 2-3 feet high, branched.

pinna'ta, stem furrowed, hispid; leaves all pinnate; flowers very large, yellow; rays long, reflexed; disk ovate, purple.

lacinia'ta, (cone-flower, cone-disk sunflower, y. Au. ♃.) lower leaves pinnate; leafets 3-lobed; upper ones ovate; egret crenate; stem glabrous. Damp. 6-10 f.

dis″color, (y. and p. Au. ♃.) branches corymbed, 1-flowered; peduncles naked, elongated; leaves lanceolate, hairy, strigose; scales of the involucrum ovate, acute; petals lanceolate, entire, two-colored, as long as the involucrum. 2 f.

trilo'ba, (y. and p. Au. ♃.) stem paniculate, branches divaricate, leafy; leaves lanceolate, acuminate at each end, serrate; lower ones 3-lobed; scales of the involucrum linear, deflexed. 4-5 f.

hir'ta, (y. and p. Ju. ♃.) very hirsute; stem virgate, sparingly branched, 1-flowered; leaves alternate, sessile, lower ones spatulate-lanceolate, hirsute; scales of the involucrum imbricate in a triple series, shorter than the ray; chaff obovate, acute. 2-3 f.

digita'ta, (y. Au. ♃.) stem branching glabrous; lower leaves pinnate; leafets pinnatifid; upper ones simply pinnate, highest 3-cleft; egret crenate. 4-8 f.

læviga'ta, (y. ♃.) very glabrous; leaves lance-ovate, acuminate at each end, triplinerved, sparingly toothed; scales of the involucrum lanceolate, as long as the ray. *S.*

mol″lis, (p. S. ♃.) stem hispid, villose, branching; leaves sessile, lance-ovate, dentate, soft-tomentose; florets of the ray numerous, three times as long as the involucrum. 2-3 f. *S.*

rad″ula, (♂.) stem hispid below, glabrous above, nearly naked; peduncles very long, 1-flowered; leaves ovate, attenuate, tuberculate-hispid; involucrum imbricate; scales ovate, acuminate, ciliate. *S.*

apet″ala, (♃.) scabrous; stem elongated, 1-flowered, very pilose at the base; rays mostly wanting; leaves radical, sub-sessile, very broadly ovate, sub-rotund. Ala. Geo.

spatula'ta, (Au. ♂.) slender, minutely pubescent; stem 1-flowered; leaves obovate spatulate, entire; involucrum expanding, imbricate; florets of the ray 3-toothed. Mountains of Carolina.

bi'color, (y. b-r. ☉.) pilose, sub-scabrous; stem somewhat 1-flowered; leaves oblong, sessile, rarely sub-serrate, obtusish; lower ones sub-ovate, petioled; segments of the involucrum oblong; scales lanceolate, hirsute; rays short, bi-colored. 18 i. Ark.

RUEL″LIA. 13—2. (*Pediculares.*)

stre'pens, (b. Ju. ♃.) erect, hairy; leaves on petioles, opposite, lance-ovate, entire; peduncles 3-4-flowered; segments of the calyx linear-lanceolate, acute, hispid, shorter than the tube of the corolla; flowers axillary; stem 8-12 i. Shady woods. Penn. to Geo.

cilio'sa, (w. p. J. ♃.) erect, branching; leaves nearly sessile, ovate-oblong; margins, nerves, and veins, fringed with long white hair; bracts lanceolate, short; segments of the calyx linear, hispid, ciliate with whitish hairs; corolla sub-equal. *S.*

hirsu'ta, (b. Oct.) hirsute, branching, leaves oval-lanceolate, nearly acute, sessile, segments of the calyx subulate, hispid, a little longer than the tube of the corolla; style very long. 12-18 i. *S.*

RU'MEX. 6—3. (*Polygoneæ.*) [From *rumex*, a spear, which the leaves of some of the species resemble.]

cris″pus, (dock, Ju. ♃.) valves of the calyx ovate, entire, all bearing grain-like appendages on their backs; leaves lanceolate, undulate, acute. 2-3 f.

ascetosel″lus, (field-sorrel, g. p. M. ♃.) valves without grains; leaves lance-hastate; flowers diœcious. 6-12 i.

aceto'sus, (garden sorrel, ♃.) stem elongated; leaves oblong, clasping, sagittate, acute. Ex.

patien″tia, (garden-dock, patience, ♃.) valves entire, one of them bearing a grain-like appendage; leaves lance-ovate. Naturalized.

obtusifo'lius, (J. ♃.) valves ovate, toothed, one chiefly granuliferous; radical leaves heart-oblong, obtuse; stem a little scabrous. Introduced. 2-3 f.

alpi'nus, polygamous; valves veined, very entire, naked; leaves cordate, obtuse, wrinkled, large, rhubarb-like. New Haven, Conn.

palli'dus, (white dock, J. ♃.) valves ovate, entire, hardly larger than the grain; spikes slender; stems numerous; leaves lance-linear, acute. Salt marshes.

verticilla'tus, valves entire, graniferous; flowers semiverticillate; racemes leafless; leaves lanceolate; sheaths cylindrical. 2 f.

sanguin''eus, valves oblong, small, one graniferous; leaves heart-lanceolate, mostly variegated with red. 2-3 f.

acu'tus, (M. ♃.) valves oblong, somewhat toothed, all graniferous; leaves cordate, oblong, acuminate, large; whorls leafy. Introduced. 2-3 f.

aquat''icus, (water dock, Ju. ♃.) valves ovate, entire, graniferous; leaves lanceolate, acute; flowers whorled.

britan''nicus, (yellow-rooted water dock, J. ♃.) valves entire and graniferous; leaves broad-lanceolate, flat, smooth; whorls of flowers leafless; sheaths obsolete. 2-3 f. Swamps.

pul''cher, (Ju. ♃.) valves toothed, one conspicuously graniferous; radical leaves panduriform. Naturalized.

veno'sus, (Ap. ♃.) valves large, heart-reniform, entire, net-veined; leaves small, lance-oval, entire, veined. 12 f. *S*.

hastatu'lus, (Ap. ♃.) valves round-cordate, entire, graniferous; leaves petioled, oblong, hastate; auricles entire. Diœcious. 1-3 f. *S*.

persic''aroi'des, (Ju. ⊙.) valves toothed, graniferous; leaves lanceolate, petioled, undulate, entire, smooth. 6-12 i. *S*.

crispatu'lus, valves obtusely cordate, crested, 3-toothed; one naked, two unequally graniferous; spikes leafless; lower leaves oval; upper ones lanceolate, all undulate. *S*.

RUP''PIA. 4—4. (*Aroideæ*.)

mariti'ma, (sea teasel-grass, J. ♃.) floating; leaves pectinate, obtuse; flowers spiked.

RU'TA. 10—1. (*Rutaceæ*.) [From *ruo*, to preserve, because it was supposed to preserve health.

grave'olens, (rue,) leaves more than decompound; leafets oblong, terminal ones obovate; petals entire. Ex.

SA'BAL. 6—3. (*Palmæ*.)

pu'mila, (Ju. ♄.) leaves fan-shape; scape panicled; flowers sub-sessile, small; berry dark-colored. 4-6 f. Florida.

min''ima, root creeping; fronds palmate, plicate; fruit brownish. 8 i. *S*.

SABBA'TIA. 5—1. (*Gentianeæ*.) [In honor of *Liberatus Sabbati*, author of a work called "*Hortus Romanus*."]

campanula'ta, (p. Au. ♂.) stem terete; leaves lanceolate-linear, smooth; calyx as long as the corolla. 1 f. Flowers terminal, sub-solitary, on long branches. Wet grounds.

stella'ris, segments of the calyx half as long as the corolla; leaves somewhat fleshy obscurely 3-nerved; flowers solitary, at the extremity of the branches, forming a small corymb; rose-colored. 12-18 i. Salt marshes.

angula'ris, (American centaury, r. Au. ⊙. and ♂.) stem square, somewhat winged; leaves clasping; branches opposite 1-2 f.

calyco'sa, flowers 7-9-parted; calyx leafy, leaves sessile.

corymbo'sa, (w. S.) flowers corymbed, corymbs few-flowered; leaves somewhat clasping; corolla 4-6-parted. Swamps.

chloroi'des, (r. Au. ♂.) weak; leaves lanceolate, erect; branches few, 1-flowered; flowers 7-12 parted; segments of the calyx linear, shorter than the corolla. Var. *erec''ta*, stem erect, rigid; leaves linear; corolla generally 10-parted; segments lanceolate. Var. *coria'cea*, stem sparingly branched, erect; lower leaves sub-oval; corolla thick, coriaceous, 18-parted. Var. *flexuo'sa*, stem flexuous; leaves lance-linear; corolla 12-parted; segments long, lanceolate. 2-3 f.

panicula''ta, (w. Au. ♃.) much branched; panicle diffuse; leaves linear-lanceolate; stem sub-terete; branches alternate. 1-2 f.

brachia'ta, (r. Ju.) leaves lanceolate; panicle long; branches brachiate, about 3-flowered; corolla twice as long as the calyx; stem erect, slightly angled. *S*.

gentianoi'des, (r. Au.) erect; leaves long, linear, acute; flowers axillary and terminal, sessile, upper ones crowded; corolla about 10-parted. *S*.

SAC''CHARUM. 3—2. (*Gramineæ*.) [The name is said to be of Arabic origin, derived from *soukar*, sugar.]

officina'rum, (sugar-cane,) flowers panicled; in pairs, one sessile and one pedicelled; corolla 1-valved, awnless. From the East Indies.

SAGI'NA. 4—4. (*Caryophylleæ*.)

procum''bens, (pearl-wort, w. Ju. ♃.) stems procumbent, smooth, branched; leaves linear-mucronate; petals very short. 2-4 i. Borders of streams. Peduncles larger than the leaves.

ape'tala, (⊙.) stems somewhat erect, subpubescent; flowers alternate; petals nearly obsolete, pale green.

erec''ta, (⊙.) glabrous; stem about 1-flowered; leaves linear, acute; peduncles strict; sepals, petals, and stamens 4. 2 i Introduced.

fontina'lis, (Ap. ⊙.) apetalous, stem procumbent, branching, dichotomous above; leaves opposite, linear-spatulate, entire; pedicels solitary, alternate, longer than the leaves. 8-15 i.

SAGITTA'RIA. 19—12. (*Junceæ*.) [From *sagitta*, an arrow; so called from the shape of the leaves of some of the species.]

sagittifo'lia, (arrow-head, w. Ju. ♃.) leaves lanceolate, acute, sagittate; lobes lanceolate, acute, straight. Var. *latifo'lia*, leaves ovate, sub-acute, sagittate; lobes ovate, slightly acuminate, straight. Var. *ma'jor*, leaves large, abruptly acute; scape sub-ramose. Var. *gra'cilis*, leaves linear; lobes much spreading, linear, long, acute. Var. *hasta'ta*, leaves oblong-lanceolate, sagittate; lobes expanding, long, very narrow. Var. *pubes″cens*, leaves, stems, bracts, and calyx, very pubescent. 1-2 f.

heterophyl″la, (w. Au. ♃.) leaves simple, linear, and lanceolate, acute at each end, or elliptical and sagittate, with the lobes linear and divaricate; scape simple, few-flowered; fertile flowers sub-sessile; bracts short, sub-orbiculate. 1 f.

obtu'sa, (w. J. ♃.) leaves sagittate, dilated-ovate, rounded at the extremity, mucronate; lobes approximate, oblong, obliquely acuminate, straight; scape simple; bracts ovate, acute. Diœcious. Ponds.

rig″ida, (w. Ju. ♃.) leaves narrow-lanceolate, carinate below, rigid, very acute at each end; scape ramose. Monœcious. Deep water.

acutifo'lia, (w. Ju. ♃.) leaves subulate, sheathed at the base, convex on the back; scape simple, few-flowered; bracts dilated, acuminate. 6 i.

na'tans, (w. Ju. ♃.) leaves floating; lance-oval, obtuse, 3-nerved, attenuated at base, lower ones sub-cordate; scape simple, few-flowered; lower peduncles elongated. 3-6 i.

gramin″ea, (w. Ju. ♃.) leaves lance-linear, glabrous, long, 3-nerved, somewhat perennial; bracts ovate, acuminate. Monœcious.

lancifo'lia, (w. J. ♃.) leaves broad, lanceolate, acute at each end, glabrous, coriaceous, entire, somewhat perennial; scape simple; seed compressed, sub-falcate. 2-3 f. Marshes.

pusil″la, (Au. ☉.) leaves linear, obtuse and short; summits foliaceous; scape simple, shorter than the leaves; flowers monœcious, few; fertile one solitary, deflexed; stamens mostly 7. Muddy banks. 2-4 i.

SALICOR″NIA. 1—1. (*Atriplices.*) [From *sal*, salt, and *cornu*, a horn.]

herba'cea, (samphire, glasswort. Au. ☉.) herbaceous, spreading; joints compressed at the apex, emarginate-bifid. Var. *virgin″ica*, has the branches undivided, and the jointed spikes long. The fructification is very obscure, but it may be known by its leafless, nearly cylindric, jointed branches. It grows in salt marshes along the seaboard. Onondaga salt springs. 12-18 i.

ambig″ua, (shrubby samphire, Ju. ♃.) perennial, procumbent, branching; joints crescent-shaped, small; spikes alternate and opposite; calyx truncate.

mucrona'ta, (dwarf samphire, Au. ☉.) low, herbaceous; joints 4-angled at base, compressed, and truncate at the top; spikes oblong, with mucronate scales.

SA'LIX. 20—2. (*Amentaceæ.*) [From *sal*, near, and *lis*, water.]

vimina'lis, (osier, basket-willow, Ap. ♄.) branches slender and flexible; filaments yellow; anthers orange; aments appear before the leaves; leaves white, silky beneath. Banks of streams. Middle-sized tree. Introduced.

babylo'nica, (weeping-willow, M. ♄.) branchlets pendent; leaves lanceolate, acuminate, serrate, glabrous, upper and lower sides of different colors; stipules roundish, contracted; aments flower as soon as the leaves appear; germs sessile, ovate, glabrous. Supposed to be the willow on which the Israelites hung their harps when captive in Babylon. Introduced.

can″dida, (white willow, Ap. ♄.) leaves lance-linear, very long, obscurely denticulate at the extremity, pubescent above, white-downy beneath; margins revolute; stipules lanceolate, as long as the petioles; aments cylindric; scales lance-obovate, very long, villose. 3-4 f. Shady woods.

muh'lenberg″ia'na, (dwarf or speckled willow, Ap. ♄.) leaves lanceolate, acutish, sub-entire, white-hairy, rugose-veined beneath; margin revolute; stipules lanceolate, deciduous; aments precede the leafing; scales oblong; margins villose; germs lance-ovate, silk-villose, long-pedicelled; styles short; stigmas bifid.

tris″tis, (mourning willow, Ap. ♄.) leaves lance-linear, acute at each end; margins revolute, smoothish above, rugose-veined and downy beneath; stipules none. 3-4 f

re'pens, (creeping willow, J. ♄.) creeping leaves lance-oval, entire, acute, glabrous, somewhat silky beneath; stipules none aments appearing before the leaves, ovate diandrous; scales obovate, obtuse, hairy, fuscous at the point; germs ovate-oblong, pedicelled, pubescent; style very short; stigmas 2-lobed; capsule smooth. Very small.

obova'ta, (♄.) diffuse; leaves obovate, obtuse, very entire, glabrous above, silky-villose beneath; stipules none; aments flower at leafing-time, sessile, oblong, diandrous; scales obovate; apex black, pilose.

lambertia'na, (Ap. ♄.) leaves lance-obovate, acute, glabrous, sub-serrate at the apex, discolored; scales round, black; filament 1; anthers 2; germs sessile, oval-ovate, silky; style short; stigmas ovate, emarginate. Introduced.

fusca'ta, (sooty willow, Ap. ♄.) leaves lance-obovate, acute, glabrous, sub-serrate, glaucous beneath, when young, pubescent, stipules very narrow; aments nodding; scales obtuse; germs short-pedicelled, ovate silky; stigma sessile, 2-lobed.

pedicel″la'ris, (stem-berried willow, Ap ♄.) branchlets smooth; leaves lance-obovate, acute, entire, both sines glabrous, and colored alike; stipules none; aments pedunculate, glabrous; scales oblong, half the length of the pedicels, scarcely pilose; germs ovate-oblong, glabrous, long-pedicelled; stigmas sessile, 2-cleft. Catskill Mountains.

rosmarin″ifo'lia, (rosemary willow, Ap ♄.) leaves straight, lance-linear, acute at each end, entire, pubescent above, silky beneath; stipules lanceolate, erect; aments precede the leafing; scales oblong, obtuse ciliate; germs pedicelled, lanceolate, villose; stigmas sub-sessile bifid. 3 f *conife'ra*, (rose willow, Ap. ♄.) leaves lance-oblong, remotely serrate, acute, glabrous above, flat and downy beneath; stipules lunate, sub-dentate; aments precede the leafing; scales lanceolate, obtuse, villose; germs pedicelled, lanceolate, silky; style bifid; stigmas 2-lobed; cone-like excresences at the end of the branches. 4-8 f.

myricoi'des, (gale-leaf willow, Ap. ♄.) leaves lance-oblong, acute, biglandular at the base, obtusely serrate, smooth, glaucous beneath; stipules ovate, acute, glandular-serrate; aments villose, leafy at the base; scales lanceolate, obtuse, villose, black; germs long-pedicelled, style bifid; stigmas bifid.

prinoi'des, (Ap. ♄.) leaves oval-oblong, acute, remotely undulate-serrate, glabrous, glaucous beneath; stipules semicordate, incisely-toothed; aments precede the leafing; germs pedicelled, ovate, acuminate, silky; style long; stigmas bifid. 6 8 f.

dis″color, (bog willow, Ap. ♄.) leaves oblong, rather obtuse, glabrous, remotely serrate, entire near the summit, glaucous beneath; stipules deciduous, lanceolate, serrate; aments flower near leafing time, diandrous, oblong, tomentose; scales oblong, acute, hairy, black; germs sub-sessile, lanceolate, tomentose; style of middling length; stigmas 2-parted.

angusta'ta, (Ap. ♄.) leaves lanceolate, acute, very long, gradually attenuated at the base, serrulate, glabrous; stipules semicordate; aments precede the leafing, erect, smoothish; germs pedicelled, ovate, smooth; style bifid; stigmas 2-lobed.

longifo'lia, (long-leaf willow, M. ♄.) leaves linear, acuminate at each end, elongated, remotely toothed, smooth; stipules lanceolate, toothed; aments peduncled, tomentose; scales flat, retuse; filaments bearded at the base; twice the length of the scales. 2 f.

purshia'na, (♄.) leaves long, lance-linear, gradually attenuate above, sub-falcate, acute at base, close-serrate, glabrous on both sides, silky when young; stipules lunate, toothed, reflexed. 8-15 f.

ni'gra, (M. ♄.) leaves lanceolate, acute at each end, serrulate, green on both sides; petiole and midrib tomentose above; stipules dentate; aments cylindric; scales oblong, very villose; filaments 3-6, bearded at the base; germs pedicelled, ovate, smooth; style very short; stigmas bifid. 15-20 f. Banks of streams.

lu'cida, (M. ♄.) leaves ovate-oblong, cuspidate-acuminate, rounded at the base, serrate, glabrous both sides, shining; stipules oblong, serrate; aments triandrous; scales lanceolate, obtuse, pilose at base, serrate, smooth at the apex; germs lanceolate-subulate, smooth, style bifid; stigmas obtuse. A small tree.

corda'ta, (heart-leaf willow, Ap. ♄.) leaves lance-oblong, acuminate, sub cordate at base, rigid, smooth, acutely serrate, paler beneath; stipules large, cordate, obtuse; stamens 3; scales lanceolate, black, woolly; germs pedicelled, smooth; style very short; stigmas bifid. 6-8 f.

gri'sea, (gray willow, Ap. ♄.) leaves lanceolate, acuminate, serrulate, glabrous above, silky or naked beneath; stipules linear, deflexed, deciduous; scales oblong, hairy, black at the apex; germs oblong, pedicelled, silky; stigma sessile, obtuse branches purple, very brittle at the base. 6 8 f.

al″ba, (M. ♄.) leaves lanceolate, acuminate, silky on both sides; lower serratures glandular; stipules obsolete; aments elongated; scales lance-oval, pubescent; germs sub-sessile, ovate-oblong, at length smooth; style short; stigma 2-parted, thick. Introduced.

vitelli'na, (yellow willow, M. ♄.) leaves lanceolate, acuminate, thickly serrate, glabrous above, paler and somewhat silky beneath; stipules none; aments cylindrical scales ovate-lanceolate, pubescent externally; germs sessile, ovate-lanceolate, stigmas sub-sessile, 2-lobed. Introduced.

russelia'na, (♄.) leaves lanceolate, acuminate, serrate, glabrous; florets generally triandrous; germs pedicelled, subulate, smooth; styles elongated. Tall tree. Introduced.

herba'cea, (Ju. ♄.) leaves round; stipules none; scales obovate, villose; germs sub-sessile, glabrous. Forms a kind of turf rising not more than an inch from the ground, yet forming a perfect miniature tree.

houston″ia'na, (♄.) leaves lance-linear, acute, finely serrate, glabrous, shining, 1-colored; stipules none; aments appearing with the leaves, cylindric, villose; scales ovate, acute; filaments 3-5, bearded at the middle. *S.*

SALSO'LA. 5—2. (*Atriplices.*) [From *sal*, salt; so called on account of its saline properties.]

ka'li, (prickly salt-wort, Ju. ☉.) decumbent; leaves subulate, rough; stem bushy; flowers solitary. Sea-shore. Burnt for the alkaline salts which it contains.

so'da, (salt-wort,) smooth, ascending.

tra'gus, (Ju. ☉.) herbaceous, smooth, spreading; leaves subulate, fleshy, mucronate-spinous; flowers sub-solitary; calyx sub-ovate; margin flattened, discolored.

SAL″VIA. 2—1. (*Labiatæ.*) [From *salvo*, to save; so called in reference to its qualities.]

lyra'ta, (wild sage. b. M. ♃.) stem nearly covered with reflexed hairs; radical leaves lyrate-dentate; upper lip of the corolla very short; flowers about 6 in a whorl. Woods. 1 f.

clayto'ni, leaves cordate, ovate, sinuate toothed, rugose; flowers violet, in whorls Woods. 8-12 i.

urticifo'lia, viscous and villose; leaves ovate-oblong, very pubescent; flowers blue, in remote whorls. Mountains.

officina'lis, (sage, b. J. ♃ or ♄.) leaves lance-ovate, crenulate; whorls few-flowered; calyx mucronate. Ex.

scla'ra, (clarry, ♂.) leaves rugose, cordate oblong, villose, serrate; floral bracts longer than the calyx, concave, acuminate. Ex.

splen''dens, (scarlet sage, r. ♃.) leaves ovate and lance-ovate, flat, smooth beneath; flower long; calyx and corolla scarlet, downy; style exsert. Ex.

azu'rea, (narrow-leaved sage, b. w. Au. ♃.) leaves lance-linear, smooth; calyx pubescent, 3-cleft; segments short. 4-6 f. *S.*

trichos''temmoi'des, (b. ☉.) leaves lanceolate, serrate; racemes terminal; flowers opposite; corolla equal to the 3-cleft calyx; stem brachiate-branched. *S.*

obova'ta, (downy-leaved sage, Ju.) leaves large, obovate, toothed, pubescent; stem slightly angled; whorls 6-flowered. 18 i. *S.*

coccin''ea, (r. Ju. ♃.) leaves cordate, acute, tomentose, serrate; corolla twice as long as the calyx, and narrower. 1 f.

au'rea, flowers golden-yellow.

formo'sa, a shrubby plant with dark scarlet flowers. Ex.

pa'tens, flowers of the richest blue.

denta'ta, flowers white.

purpu'rea, flowers purple.

SALVIN'IA. 21—1 (*Filices.*)

na'tans, (☉.) leaves elliptic, sub-cordate, obtuse, with fascicled bristles above; fruit sub-sessile, aggregated. Lakes and still waters.

SAMBU'CUS. 5—3. (*Cœprifoliæ.*) [From *Sabucca,* (Hebrew,) the name of an ancient musical instrument, made from the wood of this shrub.]

canaden''sis, (black-berried elder, w. J. ♄.) branchlets and petioles glabrous; leafets about in 4 pairs, oblong-oval, glabrous, shining, acuminate; cyme lax, divided into about 5 parts. 8-15 f.

pubes''cens, (red-berried elder. w. M. ♄.) bark warty; leafets in 2 pairs, lance-oval, pubescent beneath; flowers raceme-panicled, or in a crowded bunch. 6-12 f.

SAMO'LUS. 5—1. (*Lysimachiæ.*) [Supposed to be named from the island of Samos.]

valeran''di, (water pimpernell, brookweed, w. Ju. ♃.) erect; leaves obovate, entire; racemes many-flowered; pedicels with a minute bract. Wet grounds. 8-12 i.

ebractea'tus, (w. ♃.) stem short, robust, smooth, divided at the base; leaves obovate, obtuse, somewhat fleshy, attenuate at the base; racemes elongated, sub-pubescent; pedicels filiform, without bracts. *S.*

SANGUINA'RIA. 12—1. (*Papaveraceæ.*) [From *sanguis,* blood; so named either from the color of its root, or its use in stopping hemorrhages.]

canaden''sis. (blood-root, w. Ap. ♃.) leaves sub-reniform, sinuate-lobed; scape 1-flowered. A variety, *stenopet''ala,* has linear petals. 6-10 i.

SANGUISOR''BA. 4—1. (*Rosaceæ.*) [From *sanguis,* blood, and *sorbeo,* to absorb; so named from its medicinal qualities.]

canaden''sis, (burnet saxifrage, w. Ju. ♃.) flowers in a long, cylindric spike; stamens several times longer than the corolla. The leaves resemble the burnet. 3-5 f.

me'dia, stipes shorter than the preceding, and tinged with red. Wet meadows; chiefly on mountains.

SANIC''ULA. 5—2. (*Umbelliferæ.*) [From *sano,* to heal; so called from its virtues in healing.]

maryland''ica, (w. June–Au. ♃.) leaves all digitate; leafets oblong, deeply serrate, staminate flowers numerous, pedicelled. 2 f.

canaden''sis, (♃.) leaves palmate; segments petioled; divisions gash-serrate, lateral ones 2-parted; flowers polygamous, staminate ones short-pedicelled; lobes of the calyx entire. Canada.

SANTOLI'NA. 17—1. (*Corymbiferæ.*) [From *santalum,* saunders, because it swells like the saunders-wood.]

suaveo'lens, (y. Ju. ☉.) smooth; stem fastigiate; leaves sub-bipinnatifid; divisions acute, linear; peduncles terminal, 1-flowered.

SAPIN''DUS. 8—3. (*Sapindi.*) [From two words, *sapo indus,* Indian soap, the rind of the fruit being used as a substitute for soap.]

sapona'ria, (w. ♄.) leaves glabrous, abruptly pinnate; leafets lance-oval, frui glabrous. *S.*

SAPONA'RIA. 10—2. (*Caryophylleæ.*) [From *sapo,* soap, the juice being found to have saponaceous properties.]

officina'lis, (soap-wort, bouncing bet, w J. ♃.) calyx cylindric; leaves lance-ovate, opposite, sub-connate, entire. Naturalized. 10-18 i. Ex.

vacca'ria, (field soap-wort, r. Ju. ☉.) calyx pyramidal, 5-angled, smooth; bracts membranaceous, acute; leaves ovate-lanceolate, sessile. Introduced.

SARRACE'NIA. 12—1. (*Papaveraceæ.*) [This name is said, by some, to have been given in honor of Dr. Sarrazin, by others, it is thought to have originated in the resemblance of the peculiar flower of the plant to the head of a Saracen enveloped in his crimson turban; thus the plant is sometimes called Turk's-head.]

purpu'rea, (side-saddle flower, p. J. ♃.) leaves radical, short, gibbose-inflated, or cup-form, contracted at the mouth, having a broad, arched, lateral wing; the contracted part of the base hardly as long as the inflated part. Scape with a single, large, nodding flower. In marshes. 1-2 f.

hetĕrophyl''la, has palish yellow flowers, and is more slender than the preceding.

ru'bra, (r-p. ♃.) leaves slender; lateral wing linear; appendage ovate, erect, obtuse, mucronate, contracted at the base. 6-10 i. *S.*

fla'va, (y. J. ♃.) leaves large, funnel-form, throat expanding; lateral wing nearly wanting; appendage erect, contracted at base; reflexed at the sides. 18-24 i. *S.*

variola'ris, (y. J. ♃.) leaves slightly ventricose, with the tube near the summit spotted on the back; appendage arched, incurved; lateral wing slightly dilated; stigma acute at the angles. 12-18 i. *S.*

drummon''dii, (p.) leaves erect, very long, tube dilated above, with very narrow wing; tube and lamina whitish and strongly reticulated with purplish veins. Florida.

psittaci'na, (p. Mar.) leaves short, reclined, marked with white spots; tube inflated, with a broad semi-obovate wing, lami na ventricose, recurved, so as nearly to close the tube. *S.*

SATURE'JA. 13—1. (*Labiatæ.*) [From *satyri*, satyrs.]

horten″sis, (summer savory, b-w. Ju. ☉.) peduncles axillary, somewhat in a cyme; leaves lanceolate, entire; stem brachiate.

monta'na, (winter savory, ♄.) peduncles somewhat 1-sided; segments of the calyx acuminate, mucronate; leaves mucronate.

SAURU'RUS. 7—4. (*Naiades.*) [From *saura*, a lizard, and *oura*, tail.]

cer″nuus, (lizard's-tail, swamp-lily, Au. ♃.) stem angular, sulcate; leaves alternate, heart-oblong, acuminate. 1-2 f. Swamps.

SAUSSU'REA. 17—1. (*Ericeæ.*) [From *saura*, lizard, and *oura*, tail, alluding to the shape and scaly appearance of the long spike of flowers.]

montico'la, sparingly woolly; leaves linear, entire; leafets of the involucrum oblong-cylindric, villose, lanceolate, acute.

SAXIFRA'GA. 10—2. (*Saxifragæ.*) [From *saxum*, a stone, and *frango*, to break, because it was supposed to be a remedy against the stone in the bladder.]

virginien″sis, (rock saxifrage, w. M. ♃.) minutely pubescent; leaves oval, obtuse, crenate, decurrent into the petiole; flowers sub-sessile. 1-15 i.

pennsylva'nica, (water saxifrage, y-g. M. J. ♃.) pubescent; leaves oblong-lanceolate, acute at each extremity, obsoletely toothed; stem naked; panicle oblong, flowers fasciculate; petals linear, longer than the calyx; capsule superior. 18-28 i. Root very astringent.

sarmento'sa, (beefsteak geranium, creeping saxifrage, w. Au. ♃.) leaves roundish, toothed, hairy; sending off creeping shoots; 2 petals in each flower elongated. Ex.

aizo'on, (♃.) leaves aggregate, spatulate, acutish, smooth, with cartilaginous teeth; stem simple, pilose, leafy; calyx smooth. 3 i.

serpyl″lifo'lia, (♃.) erect; leaves small, oval, glabrous; stem 1-flowered, few-leaved; petals obovate.

androsa'cea, (w. ♃.) pubescent; leaves petioled, linear, spatulate; stem leafy, 1-2-flowered.

bronchia'lis, (♃.) stoloniferous; leaves imbricate, subulate, flat, mucronate, spinose, ciliate; stem panicled.

niva'lis, (alpine saxifrage, w. J. ♃.) leaves roundish, wedge-form, crenate-before, decurrent into the petiole; stem naked, simple; racemes crowded. 2 i.

ge'um, (♃.) leaves reniform, toothed, veinless and pilose; stem naked, panicled.

leucan″themifo'lia, (w. r. y. Ju. ♃.) very hirsute; leaves spatulate-oval, with acute and large teeth; panicles long, diffuse; calyx reflexed, persistent; petals unequal. 18-24 i.

ero'sa, (y-g. Ju. ♃.) nearly glabrous; leaves oblong-lanceolate, acute, erose, dentate; panicles oblong; branches divaricate; stem naked.

semi-pubes″cens, (y. ♃.) leaves not petioled, oblong-oval, obtuse, very glabrous, denticulate; flowers pedicelled, disposed in dense corymbs; calyx pilose-glandulose sepals triangular-ovate, acute; petals ovate, obscurely 3-nerved, somewhat equalling the calyx. Cultivated.

SCABIO'SA. 4—1. (*Dipsaceæ.*) [From *scaber*, rough; so called from its rough surface.]

stella'ta, (star scabious, y-w. ☉.) corolla 5-cleft, radiate; leaves irregularly lobed, and toothed; outer crown of the seeds orbicular, large, many-nerved.

atropurpu'rea, (sweet scabious, r. ♃.) outer crown of the seed short, lobed, and crenate; receptacle cylindric.

SCHEUCHZE'RIA. 6—3. (*Junci.*) [Named from Scheuchzer.]

palus'tris, (flowering rush, g-y. J. ♃.) leaves sheathing at the base, linear; flowers in a small, terminal raceme. Swamps.

SCHIZÆ'A. 21—1. (*Felices.*)

pusil″la, (one-sided fern, Ju. ♃.) frond simple, linear, compressed, tortuous; spikes conglomerate, inflexed one way. 3-6 i.

SCHIZAN″DRA. 19—5. (*Memispermæ.*) [From *schiro*, to split, and *anei*, a stamen, the stamens being nearly separated by fissures in the receptacle.]

coccin″ea, (r. and y. M. ♄.) glabrous; leaves alternate, lanceolate, sub-denticulate, petioled, sometimes sub-cordate, climbing. 10-15 f. *S.*

SCHŒ'NUS. 3—1. (*Cyperoideæ.*)

mariscoi'des, (water-bog rush, Ju. ♃.) culm terete or sub-sulcate, leafy; leaves channeled, semi-terete; umbel terminal; fascicles on spikes, 3 on each peduncle; seed naked, rounded at the base. 2 f.

hispidu'lus, peduncles axillary and terminal, 3-spiked; spikes globose, pedicelled; leaves filiform, hispid. *S.*

effu'sus, (saw grass, Au.) stem leafy, obtusely 3-angled; leaves aculeate; panicle terminal, very long, diffuse; pericarp ovate, longitudinally wrinkled. 6-10 f. *S.*

seta'ceus, peduncles axillary and terminal, generally 3-flowered; stem 3-angled; leaves setaceous. *S.*

SCHOL″LERA. 3—1. (*Narcissi.*) [Named from a German teacher.]

gramin″ifolia, (yellow-eyed water grass, y. Ju. ♃.) leaves all linear, grass-like; stem slender, floating. 6-18 i.

SCHRANK″IA. 15—10. (*Leguminosæ.*) [From *Schrank*, a German.]

sensiti'va, prickly; leaves pinnate; leafets in pairs, under ones very small. Sensitive plant, known by some botanists as the Mimosa sensitiva.

uncina'ta, (p. Ju. ♃.) stem prostrate, angled, prickly; leaves alternate, abruptly bi-pinnate; leafets small, thinly pilose, irritable. 2-3 f. *S.*

SCHWAL″BEA. 13—2. (*Scrophulariæ.*) [Named in honor of Schwalbe.]

america'na, (p-y. J. ♃.) simple, pubescent; leaves lanceolate; racemes terminal, flowers alternate, sub-sessile. 2 f. Chaff seed. Pine barrens.

SCIL″LA 6—1. [From *skil*, to dry; a

called from its property of drying up humors.]

mariti'ma, (squill, w.) scape long, naked many-flowered; bracts bent back; root bulbous. Ex.

SCIR''PUS. 3—1. (*Cyperoideæ.*) [An ancient Latin name for the Bull-rush.]

1. *Seed surrounded with bristles at the base.* (*Style articulated to the seed; base dilated and persistent. Seed often lenticular. Spikes terminal, solitary.*)

capita'tus, (Ju. ♃.) stem terete or sub-compressed; spike ovate, obtuse; seed oval, compressed, smooth. Wet places. 8-18 i.

ten''uis, (Ju. ♃.) culm slender, quadrangular; spike elliptical, acute at each end; glumes ovate, obtuse; stamens 3; styles 3-cleft; seed rugose. 8-12 i.

pusil''lus, (J. ♃.) culm compressed, subangular; spike ovate, compressed; seed obovate; stamens 3; style 2-3-cleft. Salt marshes. 1 i.

acicula'ris, (Ju.) culm setaceous, quadrangular; spike ovate, acute, 3-6-flowered; glumes somewhat obtuse; stamens 3; styles bifid; seed obovate. 3-6 i.

planifo'lius, (J.) culm triquetrous; radical leaves linear, flat, nearly equalling the culm; spike oblong, compressed, shorter than the cuspidate bracts at the base. 8 i. Swamps.

(*Style filiform, not bearded, deciduous.*)

lacus''tris, (J. ♃.) culm terete, attenuated above, naked; panicle sub-terminal; spikes peduncled, ovate. 4-8 f.

america'nus, (Au. ♃.) culm nearly naked, triquetrous; sides concave; spikes lateral, 1-5, ovate, conglomerate, sessile; glumes round-ovate, mucronate; seed triquetrous, acuminate. 3-5 f.

debi'lis, (Au. ♃.) culms cespitose, deeply striate; spikes about 3, ovate, sessile; glumes ovate, obtuse, mucronate; margins of ponds. 8-12 i.

brun''neus, (Au. ♃.) culm leafy, obtusely triangular; cyme decompound; involucrum 3-4-leaved; spike round-ovate, clustered in about sixes; glumes ovate, obtuse. 2-3 f.

atrovi'rens, (Ju. ♃.) culm triangular, leafy; cyme terminal, compound, proliferous; involucrum 3-leaved; spikes conglomerate, ovate, acute; glumes ovate, mucronate, pubescent. Wet meadows. 2 f.

macrosta'chyus, (Au. ♃.) culm triquetrous, leafy; corymb clustered; involucrum about 3-leaved, very long; spikes oblong; glumes ovate, 3-cleft; middle segment subulate and reflexed; style 3-cleft. 3-4 f.

Style filiform, deciduous. Bristles much longer than the seed.

eriopho'rum, (red cotton grass, Au. ♃.) stem obtusely triquetrous, leafy; panicle decompound, proliferous, nodding; spikes peduncled; bristles surrounding the pericarp exsert. 4-5 f. Swamps.

linea'tus, (leafy scirpus, Ju.) culm triquetrous, leafy; panicles terminal and lateral, decompound, at length nodding; involucrum 1-2-leaved; spikes ovate; glumes lanceolate, somewhat carinate; bristles longer than the seed. 2-3 f.

2. *Seed naked at the base.* (*Style simple at the base, not articulated to the seed, deciduous.*)

autumna'lis, (flat stemmed scirpus, S. ♃.) culm compressed, ancipitous; umbel compound; involucrum 2-leaved; spikes lanceolate, acute, a little rough; glumes mucronate, carinate. 8-12 i. Low woods.

sim''plex, (J. ♃.) culm columnar; spike somewhat ovate; glumes sub-ovate, obtuse; pericarp obovate, 3-angled. 8-13 i. *S.*

filifor''mis, (Au.) spike cylindric, oblong, obtuse; scales roundish; pericarp naked at the summit; culm filiform, terete. *S.*

tubercula'tus, (Au.) culm columnar, striate; glumes very obtuse, loose, appressed; seed somewhat 3-angled; tubercle sagittate, larger than the seed. 12 i. *S.*

equisetoi'des, (J.) culm erect, terete, doubly jointed; spike cylindric, terminal; scales very obtuse. 18-24 i. *S.*

genicula'tus, (Ju.) culm terete, growing in distinct clusters; spike ovate-oblong; scales round-ovate. *S.*

quadrangula'tus, (M. ♃.) culm erect glabrous, acutely 4-angled; 3 sides concave; one wider, flat; spike cylindric; glumes very obtuse. 1-2 f. Swamps. *S*

sylvat''icus, (wood rush, ♃.) spikes oblong, crowded; corymb leafy more than decompound; culm leafy, triquetrous; scales oblong, obtusish, green. *S.*

SCLERAN''THUS. 10—2. (*Portulacceæ.*) [From *skleros*, hard, and *anthos*, flower, alluding to its hard calyx.]

an''nuus, (knawel, ⊙.) stems slightly pubescent; calyx of the fruit spreading, acute. Stems numerous, procumbent. Flowers very small, green, in axillary fascicles. Dry fields.

peren''nis, (♃.) calyx of the fruit with obtuse, spreading segments. England.

SCLE'RIA. 19—3. (*Cyperoideæ.*) [Named from its hard and polished fruit.]

tri'glomera'ta, (whip grass, J. ♃.) culm acutely triangular, scabrous; leaves lance-linear, channeled, a little scabrous, sparingly pilose; spikes fascicled, lateral and terminal; glumes ciliate; nut smooth. 2 f.

pauciflo'ra, (Au. ♃.) culm triquetrous, glabrous; leaves linear, glabrous; spikes lateral and terminal, few-flowered, the lateral ones pendulous, fasciculate; glumes smooth; nut rugose. Wet meadows. 12-18 i.

verticilla'ta, (Au. ♃.) stem simple, triquetrous, smooth; leaves glabrous; spike glomerate, naked, clusters alternate glumes glabrous; nut globose, mucronate, transversely corrugate. 1 f.

oligan''tha, (M.) stem slender, triquetrous, glabrous; leaves narrow, nerved, slightly scabrous; spikes 2-3, sub-terminal, sessile, one lateral, one remote, long peduncled; nut very smooth, shining. 12-18 i. *S.*

gra'cilis, stem filiform, triquetrous, and with the leaves glabrous; spikes few-flowered, fascicled, sub-terminal; glumes glabrous; nut smooth, shining. 1 f. *S.*

SCOLOPEN″DRIUM. 21—1. (*Filices.*) [From *skolopendra*, centipede, so called from the numerous roots and branches, or from little marks upon the frond resembling this insect.]

officina'rium, (caterpillar fern. Ju. ♃.) frond simple, ligulate, entire, cordate at base, sub-erect; stipe chaffy. 8-15 i.

SCROPHULA'RIA. 13—2. (*Scrophulariæ.*) [From *scrofula*, the king's evil; so called because the leaves were formerly considered a remedy for scrofulous tumors.]

marylan″dica, (fig-wort, g-p. Ju. ♃.) leaves cordate, serrate, acute, rounded at the base; petioles ciliate below; panicle fasciculate, loose, few-flowered; stem obtusely angled. 2-4 f.

lanceola'ta, leaves lanceolate, unequally serrate; petioles naked; fascicles corymbed. 2-3 f. Wet meadows. Flowers greenish yellow.

SCUTELLA'RIA. 13—1. (*Labiatæ.*)

laterifio'ra, (scullcap, b. Ju. ♃.) branching, glabrous; leaves long-petioled, ovate, toothed; cauline ones sub-cordate; racemes long, lateral, leafy. Damp. 1-2 f. At one time in repute as a remedy for hydrophobia.

galericula'ta, (common scullcap, b. J. ♃.) branching; leaves sub-sessile, lance-ovate, sub-cordate at the base, crenate, white-downy beneath; flowers axillary, solitary, or in pairs; flowers large. Damp. 12-18 i.

integrifo'lia, (b. Ju. ♄.) stem nearly simple, densely pubescent; leaves sub-sessile, oblong, obtuse, wedge-form at the base, obscurely toothed; racemes loose, leafy; flowers opposite, often in panicles. Var. *hys″sopifo'lia*, has the leaves all linear. 18-24 i. Swamps.

gra'cilis, (b. J. ♃.) stem sub-simple; leaves opposite, remote, broad-ovate, toothed, veined, smooth, sessile, margins scabrous; upper ones smaller, entire; flowers axillary. 12-18 i.

ambig″ua, (b. Ju. ♃.) stem sub-decumbent, branched divaricately from the base; leaves sessile, ovate; flowers small, axillary. 3-6 i.

pilo'sa, (b. J. ♃.) erect, pubescent; leaves distant, ovate, obtuse, crenate, rugose, petioled, lower ones sub-cordate; racemes panicled; flowers crowded; bracts lanceolate, entire; calyx hispid. 18-24 i.

canes″cens, (b. ♃.) branched; leaves ovate, acute, petiolate, acutely toothed, hoary-villose beneath; lower ones sub-cordate; racemes pedicelled, sub-panicled, axillary and terminal; bracts lance-ovate, longer than the calyx. 2-3 f.

lævíga'ta, (b. M. ♃.) simple, smooth, slender; leaves petioled, opposite, ovate, coarse, serrate, veined, sub-acuminate, tapering to the base, entire at the base and apex, glabrous, paler beneath; raceme simple, terminal; flowers sub-pubescent, erect, upper bracts smaller, entire. Open woods. 12-18 i.

nervo'sa, (b. Au. ♃.) nearly simple, glabrous; leaves sessile, ovate, dentate, nerved raceme terminal, loose, leafy.

angustifo'lia, (J. ♃.) simple, finely pubescent; leaves linear; flowers axillary, opposite; stamens sub-exsert. *S.*

serra'ta, (b. Ju. ♃.) erect, branching, pubescent; leaves short-petioled, acuminate, ovate, serrate, dotted beneath; racemes terminal, loose, often panicled; bracts lanceolate, short; stamens shorter than the corolla. *S.*

SECA'LE. 3—2 (*Gramineæ.*) [From *seco*, to cut or mow.]

cerea'le, (rye, J. ♂.) glumes and bristles scabrous-ciliate; corolla smooth. Introduced.

SE'DUM. 10—5. (*Sempervivæ.*) [From *sedo*, to assuage, because it allays inflammation.]

terna'tum, (false ice-plant, w. J. ♃.) small, creeping; leaves flat, round-spatulate, ternate; flowers somewhat 3-spiked, sometimes octandrous. Cultivated.

tele'phium, (orphine, live-forever, r. w. Ju. ♃.) leaves flattish, tooth-serrate, thickly scattered; corymb leafy; stem erect. Ex.

anacamp″seros, (stone-crop, ♃.) leaves wedge-form, entire, sub-sessile; stem decumbent; flowers corymbed. Ex.

telephio'des, (p. Ju.) leaves broad, flat, ovate, acute at each end; corymbs many-flowered. 1 f. Harper's ferry.

nuttal″ii, leaves roundish, flat, entire, scattered; cymes terminal, 3-forked.

lanceola'tum, leaves sub-alternate; lower ones crowded, lance-oblong, acutish, glabrous, stem branched, assurgent; flowers cyme-corymbed; petals spreading, lanceolate.

pulchel″lum, (p.) glabrous; stems assurgent; leaves scattered, obtuse, linear; lower ones oblong-oval; cyme many-spiked; flowers sessile, octandrous. *S.*

rhodio'la, (g. y. ♃.) erect, simple; leaves glaucous, fleshy, sessile, imbricate, toothed above; cymes terminal, branching. 8 i. *S.*

pusil″lum, (w. Ju. ♃.) glabrous; leaves nearly terete, oblong, alternate; flowers sub-terminal, few, sub-pedicelled, alternate. 2-4 i. *S.*

SELI'NUM. 5—2. (*Cruciferæ.*)

aure'a, (y. ☉.) stem glabrous, sub-divided at the base, acute-triangular; leaves somewhat succulent, smooth; peduncles axillary, angular. 4-6 i. *S.*

SEMPERVI'VUM. 12—12. (*Sempervivæ.*) [From *semper*, always, and *vivo*, to live.]

tecto'rum, (houseleek, Au. ♃.) leaves ciliate; bulbs spreading; nectaries wedge-form, crenulate. Ex.

arbo'reum, (tree houseleek,) stem woody smooth, branching; leaves wedge-form, glabrous, with soft spreading hairs. Ex.

SENE'CIO. 17—2. (*Corymbosæ.*) [From *senesco*, to grow old; so called because some of its species are covered with a grayish pubescens, like the hair of an aged person.]

A. *Florets tubular; those of the ray wanting.*

hieracifo'lia, (fire-weed, w. J. ⊙.) stem virgate, paniculate; leaves clasping, oblong, acute, unequally, acutely, and deeply toothed; involucre smooth; seeds pubescent; stem 2-6 f. high, succulent, branching toward the summit; flowers in a compound, terminal panicle. Road-sides.

vulga'ris, (groundsel, y. ♃.) flowers in crowded corymbs. Stem 18 i. Cultivated grounds. Introduced.

B. *Flowers with ray florets.*

aure'a, (y. ♃.) radical leaves ovate, cordate, serrate, petiolate; cauline ones pinnatifid, toothed, the terminal segments lanceolate; peduncles thickened; flowers somewhat umbelled. Shady woods. 2 f.

obova'ta, (y. J. ♃.) stem smoothish; radical leaves obovate, crenate-serrate, petiolate; cauline ones pinnatifid, toothed; flowers somewhat umbelled, on long peduncles; rays 10-12. 1 f. Rocky hills.

paupercu'lua, (♃.) simple, erect, nearly naked; leaves lanceolate, radical ones sub-entire and gash-toothed; corymb few-flowered; involucrum smooth; rays small.

gra'cilis, (y. J. ♃.) slender; radical leaves very long, petioled, orbicular, sub-cordate, crenate; cauline ones few, very remote, linear-oblong, dilated at the base, incisely toothed; peduncles very short, hairy, sub-umbelled; involucrum smooth; rays few, very short. 1 f.

balsami'ta, (y. J. ♃.) stem and peduncles villose at the base; radical leaves oblong, serrate, petioled; cauline ones lyrate or pinnatifid; flowers sub-umbelled. Meadows. 1-2 f.

cilia'ta, (w.) pilose; leaves lance-linear, ciliate. *S.*

tomento'sa, (M. ♃.) stem simple, hoary and woolly; leaves petioled, oval, lanceolate, serrulate; corymb sub-umbelled; seed pubescent. 2 f. *S.*

fastigia'ta, (y.) leaves of the root oblong, cordate-ovate, crenate-toothed, glabrous, cauline ones pinnatifid; segments gash-toothed; flowers sub-umbelled; peduncles and involucrum glabrous. 2 3 f. *S.*

ba'ta, (butter-weed, y. M. ⊙.) glabrous; leaves pinnatifid, lyrate, lobes round, sub-repand; corymb compound; highest peduncles sub-umbelled; seed oblong, striate. 1-3 f. *S.*

SERPIC''ULA. 20—9. (*Hydrocharides.*) [From *serpo*, to creep.]

canaden''sis, (little-snake weed, w. Ju. ♃.) perfect flowers triandrous; stigmas reflexed, bifid; leaves linear, acute, somewhat whorled, glabrous, denticulate; pistillate corollas tubular.

SESA'MUM. 13—2. (*Bignoniæ.*) [An Egyptian name.]

in''dicum, (oily grain, bene-benni, r-w. Au. ⊙.) leaves lance-ovate; outer ones 3-lobed; upper ones undivided, serrate. 2-4 f.

SESBA'NIA. 16—10. (*Leguminosæ.*)

vesica'ria, (y. Au.) leaves pinnate; leafets oblong, obtuse, glabrous; racemes shorter than the leaves. 5-7 f. *S.*

macrocar''pa, (y. and p. S. ⊙.) glabrous leaves pinnate; leafets elliptic, glabrous entire, sub-glaucous beneath; racemes axillary, few-flowered; legumes slender, nearly terete. 4-12 f. *S.*

SES''ELI. 5—2. (*Umbelliferæ.*) [Origin of the name doubtful.]

triter''na'tum, (M. y. ♃.) leaves triternate; leafets long, linear; umbels hemispheric; involucrum leafy, linear; leafets equal length with the umbels.

SESLE'RIA. 3—2. (*Gromineæ.*)

dactyloi'des, (moorgrass, g.) culm leafy setaceous; leaves short, flat, subulate, sub pilose; spikes 2-3, few-flowered; calyx entire, acuminate; stipules bearded. 4-5 i. *S.*

SESU'VIUM. 11—5. (*Ficoideæ.*)

sessi'le, (r. Ju.) flowers sessile; leaves linear-oblong, flat. Stem succulent. Sea-coast.

pedun''cu'latum, (w. Au.) prostrate. terete; leaves linear-lanceolate, obtuse, entire, succulent; flowers solitary, axillary, short-peduncled, polyandrous. *S.*

SEYME'RIA. 13—2. (*Scrophulariæ.*)

tenuifo'lia, (y-p. Au. ⊙.) glabrous, very branching; leaves compound-pinnatifid; segments filiform, opposite, and alternate. corolla sub-rotate. 3-4 f. *S.*

pectina'ta, leaves pectinate-pinnatifid.

macro'phyl''la, (y. Ju.) branched; lower leaves sub-pinnatifid or deeply toothed, upper ones lanceolate, entire; corolla very woolly; stamens scarcely exserted. 4-5 f. *S*

SIBBAL''DIA. 5—5. (*Rosaceæ.*) [After Sir Robert Sibbald, author of Scotia Illustratica.]

procum''bens, (y. Ap. ♃.) leaves ternate; leafets wedge-form, 3-toothed, smooth above hairy beneath.

erec''ta, var. *parviflo'ra*, (r-w. Ju. ♂.) erect, branching; radical leaves about twice 3-cleft; segments sub-divided; leaves of the stem sessile, alternate, sub-bipinnatifid. 4-6 i. *S.*

SIC''YOS. 19—15. (*Cucurbitaceæ.*) [From the Greek *sikuos*, a cucumber.]

angula'ta, (single-seed cucumber, w. ⊙.) leaves cordate; back lobes obtuse, 5-angled scabrous, denticulate; tendrils umbellate, sterile flowers corymbose-capitate, with the common peduncle long; fertile flowers sessile; fruit small, ovate, hispid.

SI'DA. 15—12. (*Malvaceæ.*) [Origin of the name doubtful.]

abu'tilon, (Indian mallows, y. Ju. ⊙.) leaves round-cordate, acuminate, toothed, tomentose; peduncles solitary, shorter than the petioles; capsule 2-awned, truncate. 4-6 f.

spino'sa, (y. Ju. ⊙.) leaves ovate-lanceolate, serrate, dentate, with a sub-spinose tubercle at the base of the petiole; stipules setaceous; pedicels axillary, sub-solitary mostly shorter than the stipules and petiole carpels 5, bi-rostrate; seeds triquetrous ovoid. 1-2 f.

napæ'a, (w. Ju. ♃.) leaves palmately 5 lobed, glabrous; lobes oblong, acuminate, toothed; peduncles many-flowered; capsules awnless, acuminate. 2-4 f. Rocky places.

dioi'ca, (w. Oc. ♃.) leaves palmately 7-lobed, rough; lobes lanceolate, incisely dentate; peduncles many flowered, sub-corymbed, bracted; flowers diœcious. 4-5 f.

cris''pa, (w. Au. ☉.) leaves oblong-cordate, acuminate, crenate, upper ones sessile; peduncles solitary, longer than the petiole, when in fruit, deflected; capsules inflated, awnless, crisp-undulate.

his''pida, (y. Au. ♃.) hispid; leaves lanceolate, serrate; peduncles solitary, axillary; exterior calyx filiform. 1-2 f. *S.*

gra'cilis, (y. Au. ♃.) slender, glabrous; leaves linear, serrate, alternate; peduncles solitary, axillary; calyx angular. 12-18 i. *S.*

rhombifo'lia, (y. Au. ♃.) stem suffruticose, branching; leaves oblong, lanceolate, dentate, cuneate and entire at base; peduncles much longer than the petioles; capsules 2-horned. 1-2 f. *S.*

alcæoi'des, (Ju. ♃.) lower leaves triangular-cordate, gashed, upper ones palmate, many-cleft; calyx hispid. *S.*

coccin''ea, (♃. r.) stellately pubescent and hoary; leaves long-petioled, deeply 3-parted; lateral segments 2-parted, intermediate one 3-cleft; racemes terminal; styles 12. Plains of the Upper Missouri.

filicau'lis, slender, hispid; leaves ovate-oblong, cordate at the base, serrate; flowers axillary, solitary; capsules 5, 2-beaked. 2 f. Texas.

SIEGESBEC''KIA. 17—2. (*Corymbiferæ.*)

floscolo'sa, (y. Au. ☉.) leaves dentate, ovate, sessile; disk florets 3-toothed, triandrous.

lacinia'ta, leaves laciniate, pinnatifid, upper ones lanceolate, entire, tuberculate; exterior involucrum short; ray florets very large. *S.*

SIEVER''SIA. 11—12. (*Rosaceæ.*) [After M. Sievers, a Russian botanical collector.]

anemonoi'des, (w.) stem creeping, stoloniferous, 1-flowered; leaves pinnate; pinnæ ensiform, toothed at the apex; stipules filiform; capsules shorter than the calyx; style bearded.

triflo'ra, (r.) erect, simple, 3-flowered, nakedish; leaves radical; pinnæ cuneate, gash-toothed, sometimes pinnatifid; petals equalling the calyx; awns long, silky-villose. Newfoundland.

SI'LENE. 10—3. (*Caryophylleæ.*)

pennsylva'nica, (pink-catchfly, p. M. J. ♃.) viscidly pubescent; radical leaves wedge-form, stem leaves lanceolate; panicles trichotomous; petals slightly emarginate, very obtuse, sub-crenate. 8-12 i.

virgin''ica, (r. J. ♃.) erect, or decumbent; viscidly pubescent; leaves lance-oblong, scabrous on the margin; panicle dichotomous; petals bifid; stamens exsert. 12 i.

rotundifo'lia, (r. Ju.) decumbent; stem, calyx, and margin of the leaves very pilose; leaves broad-oval; flowers few, trichotomal; petals gashed, sub-4-cleft. *S.*

infla'ta, calyx bladder-like, and beautifully veined, flowers white, petals bifid. Bladder campion. Rocky hills. Ex.

arme'ria, (w-r. Au. ☉.) flowers fascicled, fastigiate; upper leaves cordate, glabrous; petals entire. Ex.

co'nica, calyx of the fruit conic, striate. Ex.

dichot''oma, racemes in pairs, terminal, 1-sided; flowers intermediate, peduncled Ex.

noctur''na, (w. J. ☉.) flowers spiked, alternate, sessile, secund; petals bifid.

stella'ta, (w. Au. ♃.) leaves verticillate in fours, oval-lanceolate, long-acuminate, calyx inflated; petals lacerate, fimbriate 2-4 f. Hill-sides.

noctiflo'ra, (w-r. Ju. ☉.) calyx veiny, 10-angled; teeth of the tube equal; petals 2-cleft; stem dichotomous. Ex.

quinque'vul''nera, (r. Ju. ☉.) hirsute, leaves cuneate-oblong, upper ones linear; petals entire, roundish; fruit alternate erect. 8-12 i. *S.*

ova'ta, (r-w. J. ♃.) leaves ovate, lanceolate, acuminate, nearly smoothish; raceme terminal, compound; calyx ovate; stamens and styles exsert; stem simple.

fimbria'ta, (M.) stem pubescent; leaves obovate, ciliate; petals large, fimbriate, white; flowers generally 3, in a terminal fascicle. 6-8 i. *S.*

antirrhi'na, (Ap. ☉.) stem pubescent near the base, sometimes spotted; leaves narrow, spatulate, lanceolate, ciliate; panicles dichotomous; petals small, bifid; stamens included. 1-2 f. *S.*

axilla'ris, (p. Au.) viscid-pubescent; stem branched; leaves ovate, oval, petioled, sub-dentate; flowers axillary, sessile, solitary. 8 i. *S.*

SILPH''IUM. 17—4. (*Corymbiferæ.*)

perfolia'tum, (ragged-cup, y. Au. ♃.) stem 4-angled, smooth; leaves opposite, connate, ovate, serrate. 6 f. Rays 24 Mountains.

trifolia'tum, leaves verticillate by threes, panicle trichotomous; stem 4-6 f. high, mostly purple; ray florets about 14, long, bright yellow.

integrifo'lium, (y. Au. ♃.) stem 4-angled, rough; leaves opposite, erect, sessile, oblong, entire, scabrous; flowers few, short-peduncled. 4 f.

terna'tum, (y. Ju. ♃.) stem terete, glabrous; leaves verticillate by threes, petioled, lanceolate, sub-denticulate, somewhat scabrous, ciliate at the base; upper ones scattered, sessile; panicle dichotomous; calyx ciliate. 4-6 f.

gummif''erum, (y. Ju.) erect, hispid, gummiferous; leaves sinuate, pinnatifid, sub-hispid beneath; flowers large, axillary, sub-sessile; scales of the involucrum ovate, acuminate, outer ones fringed or hispid on the margins. 2-3 f.

terebin''thina'ceum, (y. Ju. ♃.) erect, glabrous; radical leaves large, round, or reniform, cordate, slightly lobed and toothed, cauline leaves alternate, ovate, serrate, scabrous; panicle compound, many-flowered. 4-5 f.

lacinia'tum, (y. Au. ♃.) stem simple hispid above; leaves pinnatifid, alternate, petioled; segments tooth-sinuate; flowers panicled; scales of the involucrum sub-cordate, acuminate. 8-12 f. *S.*

compos''itum, (y. Ju. ♃.) smooth; cauline leaves sinuate, pinnatifid, radical ones ternate, sinuate, many-cleft; flowers small, panicled. 2-4 f. *S.*

conna'tum, (y. Au. ♃.) erect, terete, hispid; leaves opposite, connate, scabrous, remotely serrate; panicle terminal, dichotomous. 6 f. *S.*

pinnatifi'dum, (y. Au.) stem somewhat glabrous; leaves sinuate, pinnatifid, subscabrous, a little hairy beneath; flowers large; scales of the involucrum oval, outer ones roundish. 4-6 f. *S.*

lævіga'tum, (y. Au.) stem simple, 4-angled, furrowed, glabrous; leaves sessile, ovate-acuminate, slightly serrate, sub-cordate at the base, glabrous; scales of the involucrum ovate, ciliate. 2 f.

scaber"rimum, (y. Au.) stem sub-angled; angles rough above; leaves short-petioled, ovate, sub-acuminate, serrate, rigid, scabrous; flowers corymbed; scales of the involucrum ovate, ciliate. 3-4 f. *S.*

atropur"pu'reum, (y. Au. ♃.) terete, smooth; leaves verticillate by fours, lanceolate, scabrous, sub-entire, sub-sessile, ciliate at base, upper ones scattered; panicle dichotomous. 4 f. *S.*

denta'tum, (y. Au.) erect, somewhat glabrous; lower leaves opposite, upper ones alternate, all lanceolate, sinuate-toothed, pilose, scabrous; flowers corymbed; scales of the involucrum broad-ovate, ciliate. 2-3 f. *S.*

ela'tum (y. ♃.) leaves petioled, alternate, cordate, sinuate; scales of the involucrum obtuse. *S.*

reticula'tum, (y. ♃.) leaves alternate, ovate-lanceolate, cordate, serrate, rather obtuse, a little villose. *S.*

SINA'PIS. 14—2. (*Cruciferæ.*)

ni'gra, (common mustard, y. J. ☉.) silique glabrous, 4-angled, close-pressed to the stem; leaves at the top lance-linear, entire, smooth. Naturalized.

al'ba, (white mustard,) pod mostly hispid, spreading; flowers corymbose. 1-2 f. Introduced.

arven"sis, (y. Ju. ☉.) stem and leaves hairy; siliques glabrous, many-angled, uneven, about three times the length of the style; style slender, ancipital. Introduced.

SIPHONY'CHIA. 5—1. (*Amaranti.*) [From *siphon*, tube, funnel, and *nuchios*, night.]

america'na, leaves oblanceolate, shorter than the internodes, a little hairy below, ciliate, rather obtuse; stem much branched, minutely and retrosely pubescent; flowers in small, glomerate cymes at the ends of the branches.

SI'SON. 5—2. (*Umbelliferea.*)

majus, glabrous; leaves cut-pinnate; lobes with cartilaginous margins, sharply serrulate, those of the lower ones lanceolate, of the upper ones many-cleft and linear.

rubricau le, leaves semi-verticillate, cut tri-pinnate; segments capillaceous; partial involucres compound, longer than the umbellets.

SISYM"BRIUM. 14—2. (*Cruciferæ.*) [From *sisubos*, fringe, so called from its fringed roots.]

officin"ale, (y. Ju. ☉.) leaves runcinate hairy; flowers in a long raceme; pod subulate. 1-2 f. Stem hairy, branched. Road sides.

canes"cens, (y. Ap. ☉.) leaves bi-pinnatifid, hoary; segments dentate, obtuse, sometimes obovate; petals as long as the calyx; siliques sub-angled, ascending, shorter than the peduncle; stigma capitate. 1-2 f.

cheiranthoi'des, (y. J. ☉.) siliques erect, fruit-bearing pedicels spreading; leaves nearly entire, lanceolate. Canada.

SISYRIN"CHIUM. 15—3. (*Irideæ.*)

an"ceps, (blue-eyed grass, b. J. ♃.) scape or culm simple, 2-edged or 2-winged; glume-like spatha of 2 unequal valves, extending above the flower; petals mucronate. Hedge-mustard. 6-12 i.

mucrona'tum, scape simple, winged; spatha colored, one of the valves ending in a long, rigid point; stem setaceous. 6-10 i Flowers 3-4 in a spatha, blue.

SI'UM. 5—2. (*Umbelliferæ.*) [From *scio*, to move, from its agitation in the water.]

latifo'lium, (water-parsnip, w. Ju. ♃.) root creeping; stem erect, angular; leaves pinnate; leafets ovate, lanceolate, sessile, smooth, serrate, sometimes pinnatifid; umbels terminal, large, rayed; involucres many-leaved. 2-4 f. The leaves that grow in water are bi-pinnatifid. Swamps.

linea're, leafets linear, lanceolate, acutely and finely serrate; stem tall.

SMI'LAX. 20—6. (*Asparagi.*) [From *smileus*, to cut; so called from the roughness of its leaves and stalk.]

1. *Stems frutescent.*

sarsaparil"la, (Ju. ♃.) stem prickly, slightly 4-angled; leaves unarmed, ovate-lanceolate, cuspidate, sub-5-nerved, glaucous beneath; peduncles long.

quadran"gula'ris, (Ju. ♄.) leaves unarmed, ovate, sub-cordate, acute, 5-nerved; stem prickly, 4-angled; berries black.

cadu'ca, (J. ♄.) stem flexuous, aculeate; leaves ovate, mucronate, membranaceous, 5-nerved; common peduncle scarcely longer than the petiole.

pandura'ta, (Ju. ♄.) aculeate; leaves ovate-panduriform, acuminate, 3-nerved; peduncle twice as long as the petiole. Sandy woods.

laurifo'lia, (Ju. ♄.) aculeate; branches unarmed; leaves coriaceous, perennial, oval-lanceolate, slightly acuminate, 3-nerved; umbels short, peduncled.

pseu'do-chi'na, (J. ♄.) unarmed cauline leaves cordate, ramose ones oblong-ovate, 5-nerved; peduncles very long.

rotundifo'lia, (green-brier, w-g. Ju. ♃.) stem prickly, sub-terete; leaves unarmed, roundish-ovate, short-acuminate, cordate, 5-7 nerved; berries spherical.

2. *Stems herbaceous.*

pedun"cula'ris, (Jacob's ladder, w-g M. ♃.) stem round, climbing; leaves round-ovate, cordate, acuminate, 9-nerved; umbels long-pedicelled. 3-5 f. Low grounds.

herba'cea, (bohea tea, g J. ♃.) stem erect, simple, slightly angled; leaves long-peti oled oval, nerved, pubescent beneath; umbels with long, compressed peduncles; berries spherical.

tamnoi'des, (Ju. ♄.) stem round, aculeate; leaves ovate-oblong, acute, sub-panduriform, obsoletely cordate, 5-nerved; common peduncle longer than the petiole.

hasta'ta, (Ju. ♄.) stem angled, prickly; branches unarmed; leaves lanceolate, acuminate, hastate-auricled at the base, 3-nerved, prickly, ciliate on the margin. Var. *lanceola ta*, leaves long, narrow, lanceolate. *S.*

bona'nox, (Ju. ♄.) stem unarmed, angled; leaves heart-ovate, smooth, 7-nerved, prickly, ciliate. *S.*

ova'ta, (Ju. ♄.) generally unarmed; leaves ovate, acute, cuspidate, 3-nerved, uniformly colored; common peduncle shorter than the petiole. *S.*

cin''cidifo'lia, (♄.) prickly; leaves unarmed, round-cordate, acuminate, 5-nerved, glabrous, net-veined, short-petioled. *S.*

walte'ri, (Ju. ♃.) aculeate; leaves cordate, ovate, smooth, 3-nerved; berries 3-seeded, acuminate. *S.*

al''ba, (J. ♄.) generally unarmed; stem obsoletely angled; leaves lance-elongated, coriaceous, glabrous, entire, 3-nerved, umbels short-peduncled, few-flowered. *S.*

pu'mila, (S. ♄.) unarmed; leaves cordate, ovate, entire, somewhat 5-nerved, soft-pubescent beneath; umbels short-peduncled; pedicels very short; berries oblong, acute; stem prostrate; corolla 0. 2-4 f. *S*

lanceola'ta, (J. ♄.) unarmed; leaves lanceolate and ovate, acute or acuminate, 3-5 nerved, very glabrous, perennial; umbels many-flowered; peduncles short; berries red. *S.*

ru'bens, a very handsome species, the tendrils of which are of a bright red. Ex.

excel''sa, remarkable for the large size of the leaves. Ex.

SOLA'NUM. 5—1. (*Solaneæ.*) [From *solor*, comfort, because some species give ease by their narcotic quality.]

dulcama'ra, (bitter-sweet, p-b. Ju. ♄.) stem unarmed, woody, climbing; lower leaves mostly cordate, glabrous, upper ones mostly guitar-hastate, few-flowered; corymbs opposite to the leaves. This is the true bitter-sweet, though the celastrus scandens is called so by some. Damp.

ni'grum, (deadly night-shade, w-p-b. J. ☉.) stem unarmed, erectish, or erect; branches angled, dentate; leaves ovate, repand, glabrous; racemes 2-ranked, nodding. 1-2 f. Ex.

tubero'sum, (potato, b-w. Ju. ♄.) stem wing-angled, unarmed; leaves interruptedly pinnate; leafets entire; flowers sub-corymbed; roots knobbed, tuberous. Cultivated.

lycoper''sicum, (love-apple, tomato, y. S. ☉.) stem unarmed, leaved pinnatifid, gashed; racemes 2 parted, leafless; frui glabrous, torulose. Ex.

pseudo-capsi'cum, (Jerusalem cherry, ♄.) stem woody; leaves lanceolate, repand; umbels sessile. Ex.

carolin''ense, (horse-nettle, b J ☉.) stem aculeate; leaves ovate-oblong, tomento hastate-angled; racemes lax. 1-2 f.

flavid''um, suffruticose, densely tomentose; branchlets and calyx aculeate; leaves solitary, oblong, obtusish, lower ones repand-sinuate, upper ones obsoletely sinuate; racemes about 3-flowered.

melonge'na, (egg-plant, J. ☉.) unarmed; leaves ovate, tomentose; peduncles pendent, incrassate; calyx unarmed. Ex.

mammo'sum, (y. Ju. ☉.) stem aculeate, herbaceous; leaves cordate, angled, lobed villose on both sides and prickly. *S.*

virginia'num, (b. Ju. ☉.) stem erect, aculeate; leaves pinnatifid, prickly; segments sinuate, obtuse; margins ciliate calyx prickly. *S.*

verbascifo'lium, (♄.) stem unarmed, frutescent; leaves ovate, tomentose, entire; corymbs bifid, terminal. *S.*

hirsu'tum, (p. ♃.) small, pilose, hirsute; leaves broad-obovate; raceme somewhat 3-flowered; peduncles filiform. *S.*

SOLE'A. 5—1. (*Cisti.*)

con''color, (Ap. w-y. ♃.) stem simple, erect; leaves wedge-form, lanceolate, sessile, irregularly toothed above; peduncles short, 2 3 flowered; calyx nearly as long as the petals; spur none. 2-4 f. Rocks. Green violet.

SOLIDA'GO. 17—2. (*Corymbiferæ.*) [From *solido*, to make firm, from its supposed virtue in healing wounds.]

A. *Flowers one-sided; leaves with three combined nerves.*

canaden''sis, (Canadian golden-rod, y. Ju. ♃.) stem downy; leaves lanceolate, serrate, rough; racemes panicled, recurved; rays hardly longer than the disk; stem angular leaves sessile, three inches long, sometimes nearly entire. 2-5 f.

pro'cera, (great golden rod, y. Ju. ♃.) erect, villose; leaves lanceolate, serrate, scabrous, villose beneath; racemes erect, spike-form, before flowering, nodding; rays short. 4-7 f. Low grounds.

cilia'ris, (fringed golden-rod, y. ♃.) stem erect, smooth, angular; leaves lanceolate, sub 3-nerved, smooth, scabrous on the margin; racemes panicled, secund; peduncles glabrous; bracts ciliate; rays short. 3 f.

reflex''a, (y. Au. ♃.) erect, villose; leaves lanceolate, sub-serrate, scabrous, reflexed, branches panicled, sub-secund, reflexed. Pine woods.

gigan''tea, (giant golden-rod, y. Au. ♃.) stem erect, glabrous; leaves lanceolate smooth, serrate, rough-edged, obscurely 3-nerved; racemes panicled; peduncles rough-haired; rays short. 4-7 f.

lateri'flora, (side-flowered golden-rod, y Au. ♃.) stem erect, a little hairy; leaves lanceolate, slightly 3-nerved, glabrous, rough-edged, lower ones sub-serrate; racemes panicled, a little recurved, sub-secund; flowers large, the rays being much longer than the calyx; stem striated, often purplish, pinnatifid, with numerous lateral flowering branches 2-3 f.

B. *Racemes or flowers 1-sided; leaves veiny*

altis''sima, (variable golden-rod. y Au.

♃.) stem erect, rough-haired; leaves lanceolate, lower ones deeply serrate, scabrous, rugose. The panicled racemes are very numerous, and spread every way, so as to bring the one-sided flowers upward; rays short; the serratures of the leaves irregular; it is hairy or villose, and sometime the racemes diverge but little. This species is variable. 3-6 f. 169

as''pera, (y. Au. ♃.) erect, terete, hairy; leaves ovate, somewhat elliptic, very scabrous, rugose, serrate, nerveless; racemes panicled, secund. 3-5 f.

nemora'lis, (woolly golden-rod, y. Au. ♃.) erect, tomentose; radical leaves somewhat cuneate, serrate, caulines ones lanceolate, hispid, entire; racemes panicled. Plant grayish. 1-3 f.

ulmifo'lia, (elm golden-rod, y. Au. ♃.) erect, smooth, striate; leaves elliptic, deeply serrate, acuminate, villose beneath, radical ones obovate; racemes panicled; peduncles villose; rays short. 3-4 f.

argu'ta, (y. Oc. ♃.) erect, smooth; leaves glabrous, acutely and unequally serrate, radical ones oblong-ovate, cauline ones elliptic; racemes panicled; rays elongated. 2-3 f.

jun''cea, (rush-stalk golden-rod, y. Au. ♃.) erect, smooth, slender; leaves lanceolate, glabrous, smooth, rough-edged, lower ones serrate; racemes panicled. 2-3 f.

ellip''tica, (oval-leaf golden-rod, y. Au. ♃.) erect, smooth; leaves oval, smooth, serrate; racemes panicled; rays middle-sized. 2-3 f.

recurva'ta, (y. S. ♃.) erect, pubescent; leaves lanceolate, serrate, rough edged; racemes elongated, panicled, recurved. Shady woods.

sempervi'rens, (narrow-leaf golden-rod, y. S. ♃.) erect, smooth; leaves lanceolate, narrow, long, somewhat carnose, smooth, entire, rough-edged; peduncles hairy. 3-5 f. Swamps.

odo'ra, (sweet-scented golden-rod, y. Au. ♃.) pubescent; leaves lance-linear, entire, smooth, scabrous on the margin; racemes panicled. The flowers, when dried, form an excellent substitute for tea, and the leaves, when distilled, yield a fragrant volatile oil.

pat''ula, (spread golden-rod, y. S. ♃.) stem erect, glabrous; leaves oval, serrate, glabrous, radical ones oblong-spatulate; racemes panicled, spreading; peduncles pubescent; stem wand-like, angular, and striate; stem leaves sessile, about an inch long, pointed, the radical ones resemble those of the ox-eyed daisy; racemes about an inch long; flowers rather large. 2 f.

C. *Racemes erect.*

bi-color, (white golden-rod, w. Au. ♃.) stem hairy; leaves oval, hairy, lower ones serrate, those on the flower branches entire, numerous, and small; scale and calyx obtuse, racemes are short and compact; rays white, somewhat numerous and shortish; disk florets rather numerous. 2-4 f.

specio'sa, (y. S. ♃.) tall, smooth; branches virgate; leaves lanceolate, sub-coriaceous lower ones sparingly serrate; racemes terminal, erect, compound; peduncles short rays about 5, elongated. 3-6 f.

virga'ta, (y. Au. ♃.) stem smooth, simple; leaves lanceolate, somewhat cuneate obtuse, entire, glabrous, close-pressed; upper ones gradually smaller; branches of the panicle elongated, racemed at the summit; peduncles erect, smooth, slender. 2 f

petiola'ris, (late golden rod, y. Oc. ♃.) villose; leaves elliptic, roughish, petioled; racemes numerous, short; rays elongated. 2-3 f.

stric''ta, (willow-leaf golden-rod, y. Au. ♃.) erect, glabrous; radical leaves serrate, cauline ones lanceolate, entire, smooth, scabrous on the margin; racemes panicled, erect; peduncles smooth. 2 f. Sandy woods.

gramin''ifo'lia, (y. S. ♃.) stem angled, branching; leaves lanceolate-linear, entire, nearly erect, 3-5-nerved, a little scabrous; corymbs terminal, fastigiate; heads clustered; florets of the ray as long as the disk.

tenuifo'lia, (pigmy golden-rod, y. S. ♃.) stem angled, scabrous; branches fastigiate; leaves linear, narrow, expanding, slightly 3-nerved, scabrous, axils leafy; corymbs terminal, fastigiate; heads clustered; ray florets about 10, scarcely exceeding the disk. 1-2 f.

cæ'sia, (blue-stem golden-rod, y. Au. ♃.) stem smooth, tinged with purple, sub-glaucous; leaves lanceolate, smooth, serrate, sometimes rough-edged; racemes erect; rays middle-sized. 2-3 f.

liv''ida, (purple stem golden-rod, y. S. ♃.) stem smooth, panicled, dark purple; leaves lanceolate, serrate, smooth, margins scabrous; branches racemed at the extremity, rays elongated.

lithosper''mifo'lia, (y. S. ♃.) stem pubescent, branched; leaves lanceolate, scabrous, tapering, 3-nerved, entire; ray-florets elongated.

puber''ula, (y. ♃.) stem brownish, simple, sub-pubescent, terete; leaves lanceolate, entire, sub-pubescent, tapering; radical ones sub-terete; racemes spiked, axillary, peduncles pubescent; scales of the involucrum lance-linear, acute; ray-florets elongated, about 10.

læviga'ta, (y. S. ♃.) erect, smooth; leaves lanceolate, fleshy, entire, very smooth, radical leaves sub-ovate; racemes panicled, erect; peduncles scaly, villose; rays elongated, about 10. 4-5 f.

limonifo'lia, (y. Oc. ♃.) stem oblique, smooth, generally purple; leaves lanceolate, somewhat carnose, entire, smooth; racemes panicled, erect; peduncles scaly, smooth; rays long. 3-5 f. Salt marshes.

flexicau'lis, (zigzag golden-rod, y. S. ♃.) stem flexuous, smooth, angled; leaves ovate, acuminate, serrate, glabrous; racemes axillary, erect, short, scattered, rays middle-sized. 2-3 f. Woods.

rigid''a, (y. S. ♃.) stem corymbed, hairy scabrous; leaves ovate-oblong, rough, with small, rigid hairs; those of the stem very entire, lower ones serrate; flowering branches panicled; racemes compact; rays elongated; scales of the involucrum obtuse. 3-4 f.

latifo'lia, (y. S. Oc. ♃.) stem somewhat flexuous, angular, smooth; leaves broad-ovate, acuminate, deeply serrate, glabrous; petioles winged; racemes axillary. 18 i. Dry woods.

vimin''ea, (twig golden-rod, y. Au. Oc. ♃.) erect, sub-pubescent; leaves lance-linear, membranaceous, attenuate at base, glabrous; margins scabrous; lower ones sub-serrate; racemes erect; rays elongated. Banks of streams.

virgau'rea, (European golden-rod, y. ♃.) stem terete, pubescent, flexuous; leaves serrate, roughish, attenuate at the base; racemes panicled, erect; rays elongated; flowers large. 1-3 f. Var. *alpi'na*, small; leaves obovate or lanceolate. 3-6 i. The only species common to both continents.

novebo'racen''sis, (star golden-rod, y. Oc. ♃.) stem nearly leafless; branches fastigiate; leaves rough, radical ones ovate-oblong, petioled; flowers large. 2-3 f. Sandy fields.

Southern species.

1. *Racemes one-sided.*

cineras''cens, (y. S. ♃.) stem slender, pubescent; leaves long, linear-lanceolate, attenuate at base, serrate, sub-scabrous, pubescent, racemes recurved; peduncles and ray-florets elongated; seeds pubescent. 3 f.

tortifo'lia, (y. S. ♃.) stem pubescent; leaves linear-lanceolate, sub-serrate, expanding, twisted, the upper surface and midrib scabrous, nearly glabrous beneath; panicle pyramidal; racemes recurved. 3 f.

corymbo'sa, (y. S. ♃.) stem robust and virgately erect, glabrous; branches hispid; lower leaves lance-oblong; upper ones ovate, all fleshy, glabrous, rigid, margins scabrous and ciliate; racemes corymbed; lower ones recurved; ray-florets elongated. 4-6 f.

pitch''eri, racemes glabrous; leaves glabrous, thickly set, lance-oblong, acuminate at each end, sharply serrate; panicle pyramidal. few-flowered; pedicels pubescent; liguli abbreviated. Ark.

pyramida'ta, (y. S. ♃.) stem terete, hispid; leaves oblong, acute, somewhat amplexicaul, sessile, glabrous, margins scabrous, rarely and obsoletely toothed; panicle naked, pyramidal; branches reflexed; peduncles squamose. 4-6 f.

retror''sa, (y S. ♃.) stem terete, glabrous, somewhat amplexicaul, pubescent towards the summit; leaves closely sessile, linear, tapering above, glabrous, pellucid-punctate, reflexed margins rough; branches of the panicle recurved.

2. *Racemes erect.*

pulverulen''ta, (y. ♃.) stem simple; stem and leaves pulverulent-pubescent; leaves sessile; lower ones elliptic, serrate; upper ones obovate, entire, margins scabrous; racemes erect, spike-form, ray-florets elongated. 3-4 f.

pubes''cens, (y. Oc. ♃.) stem branching, pubescent, slightly scabrous. generally colored, with numerous branches rigidly erect; leaves long, lanceolate, tapering at base, pubescent; lower ones serrate; racemes erect, panicled; ray-florets middle sized. 3-4 f.

pauciflos''culo'sa, (y. S. ♃.) smooth, suffruticose; leaves lanceolate, obtuse, nerveless; panicle compound, many-flowered; the clusters erect; involucrum oblong, 5-flowered; floret of the ray, one.

glomera'ta, (y. ♃.) stem simple, low; leaves glabrous, lance-oblong, serrate; lower ones broad-oval, acuminate; racemes simple, composed of axillary heads, upper ones clustered; involucrum turgid, many-flowered.

angustifo'lia, (y. S. ♃.) stem glabrous, generally colored, with many slender, erect branches above; leaves subulate-linear, entire, glabrous; racemes erect, panicled; ray-florets middle sized. 2-3 f.

ela'ta, (y. S. ♃.) stem terete, hairy, tomentose above; leaves lance-oval, acute, sub-entire, veiny, tomentose beneath; racemes erect, panicled; ray-florets elongated. 2-3 f.

salici'na, (y. S. ♃.) stem tall, slender, pubescent above, somewhat scabrous; branches virgate, long, erect; leaves lanceolate, sessile, scabrous above, glabrous beneath; lower ones serrate; racemes sub-secund; branches short, sometimes recurved. 4-5 f.

hirsu'ta, sub-pilose; stem simple; racemes erect; flowers sub-racemose-glomerate; leaves elliptic-ovate. scattered; lower ones spatulate, finely crenate.

squarro'sa, (y. S.) stem branching, pubescent; leaves lanceolate, acute, serrate, softly pubescent beneath; lower ones tapering at base; racemes compound, erect; flowers large; involucrum squarrose; ray-florets about 10, scarcely longer than the involucrum. 3-5 f.

SON''CHUS. 17—1. (*Corymbiferæ.*)

olera'ceus, (sow-thistle, y. Ju. ⊙.) leaves lance-oblong, clasping, slightly toothed and serrate; peduncles axillary and terminal covered with cotton-like down. Waste grounds. 2-4 f. Introduced.

arven'sis, root creeping; leaves runcinate, denticulate, cordate at the base; involucre hispid; flowers large, deep yellow; stem 2 f.

macrophyl'lus, (b. Au. ♃.) leaves lyrate. cordate at base, hairy beneath; peduncles hairy, naked; flowers panicled. 4-7 f.

spinulo'sus, (y. Au. ⊙.) leaves clasping, undulate, spinose, oblong; flowers somewhat umbelled. 2 f. Salt marshes.

leucophæ'us, (b-w. Ju. ♂.) peduncles squamose; flowers racemed; leaves runcinate, acuminate; stem virgate and panicled. 2-5 f. Swamps.

florida'nus, (b. Ju. ♂.) peduncles sub-squamose; flowers panicled; leaves lyrate-runcinate, denticulate, petioled. 3-6 f.

acumina'tus, (b. Au. ♂.) peduncles sub-squamose; flowers panicled; radical leaves sub-runcinate; cauline ones ovate, acuminate, petioled, denticulate in the middle. 3-5 f. Woods.

pallid″us, (y. J. ♃.) raceme compound, terminal; leaves lance-ensiform, amplexicaul, dentate. 2-3 f.

carolinia′nus, (y. Au. ☉.) erect, glabrous, fistulous; leaves lanceolate, acute, undulate, sub-spinose, toothed, auricled at the base, semi-amplexicaul; flowers somewhat umbelled. 1-3 f. *S.*

SOPHO′RA. 10—1. (*Leguminosæ.*)

serice′a, leaves pinnate; leafets wedge-oval, smooth above, silky-villose beneath; spikes many-flowered, sub-sessile; flowers white. ♃. 1 f.

japon″ica, a tree which produces large bunches of cream-colored flowers in August and September. The drooping sophora, a variety of the japonica, is very different in appearance, being a trailing shrub, which sends out shoots six or eight feet long, in a single season. Ex.

SOR″BUS. 11—5. (*Rosaceæ.*) [From *sorbeo*, to suck up, because its fruit stops hemorrhages.]

america′na, (mountain-ash, w. M. ♄.) leaves pinnate; leafets lance-oblong, acute, serrate, very smooth; flowers in terminal corymbs. The yellowish berries remain on the tree during winter. 13-20 f.

microcar″pa, fruit small, scarlet.

SOR″GHUM. 3—2. (*Gramineæ.*) [An Indian name.]

sacchara′tum, (broom-corn, y-g. Au. ☉.) panicle somewhat whorled, spreading; seeds oval; glumes covered with permanent, softish hairs; leaves linear. From the East Indies. 6-8 f.

vulga′re, (Indian millet,) panicle compact, oval, nodding when mature; seed naked.

SPARGA′NIUM. 19—3. (*Typhæ.*) [From *sparganon*, a band or fillet, from the long linear form and pliant texture of the leaves.]

ramo′sum, (bur-reed, w. Ju. ☉.) the 3-sided bases of the leaves concave on the two outsides; the general fruit stem branched; stigmas linear. In water generally. Flowers in round heads; the staminate heads above the pistillate, and considerably the smallest.

angus″tifo′lium, (floating bur-reed, w. Au. ♃.) leaves flat, long linear, very narrow, much longer than the stem, weak; the part above water floating on its surface. Grows in great abundance in the little lake on Catskill Mountain, near the Mountain House.

SPARGANOPH″ORUS. 17—1. (*Corymbiferæ.*) [From *sparganon*, a crown, and *phero*, to bear.]

verticilla′tus, (water-crown-cup, p. Au. ♃.) leaves linear, verticillate; pods few, terminal; egret 5-toothed, submersed.

SPAR″TIUM. 16—10. (*Leguminosæ.*) [From *sparto*, a rope; so called because the tough branches and bark are used in making cordage.]

junce′um, (Spanish broom, g. ♄.) branches opposite, virgate, with terminal flowers leaves lanceolate, glabrous.

scopa′rium, (Scotch broom, g. ♄.) leaves ternate, solitary, and oblong; flowers axillary; legumes pilose at the margin; branches angular.

SPER″GULA. 10—5. (*Caryophylleæ.*) [From *spergos*, to scatter.]

arven″sis, (spurry, w. Ju. ☉.) leaves whorled; panicles dichotomous; peduncles of the fruit becoming reflexed.

saginoi′des, (pearl-wort spurry, w. J. ☉.) glabrous; leaves opposite, subulate, awnless; peduncles solitary, very long, smooth 2-3 i.

ru′bra, (red sand-wort, r. J. ☉.) stem prostrate, glabrous; leaves filiform, fleshy, larger than the joints; stipules cuneate-membranaceous, sheathing; stamens 5; capsule angular or globose. 8 i.

SPERMACO′CE. 4—1. (*Rubiaceæ.*) [From *sperma*, seed, and *akoke*, a sharp point; the seeds being pointed.]

ten″uior, (w. Ju. ☉.) lanceolate; flowers verticillate, stamens included; seeds hirsute. *S.*

diodi′na, (Ju. ☉.) stem terete; leaves linear-lanceolate, sessile; flowers axillary, sessile; stamens shorter than the corolla. Dry soils. *S.*

involucra′ta, (w.) stem very hispid; leaves ovate, lanceolate, acuminate; stipules many-bristled; heads terminal, involucred, stamens longer than the corolla. 1 f. *S.*

gla′bra, (w. J. ☉.) stem procumbent glabrous; leaves ovate-lanceolate, glabrous, flowers verticillate; seeds glabrous. *S.*

SPIGE′LIA. 5—1. (*Gentianeæ.*) [Named by Linnæus, in honor of Adrian Spigelias, a botanist who wrote in 1606.]

maryland″ica, (Indian pink-root, p. J. ♃.) stem 4-sided; leaves all opposite, sessile, lance-ovate, entire. 9-18 i. Sometimes called worm-grass, on account of its efficacy in cases of disease arising from worms.

SPINA′CIA. 20—5. (*Polygoneæ.*) [From *Ispania*, Spain, whence it originated.]

olera′cea, (spinach, J. ☉.) fruit sessile, prickly or unarmed; leaves hastate-sagittate; stem branched. 1-2 f. Ex.

SPIRÆ′A. 11—5. (*Rosaceæ.*) [From *spira*, a pillar; so named from its spiral stalk.]

Stem more or less woody.

salicifo′lia, (meadow-sweet, willow hardhack, r. w. J. ♄.) leaves lance-ovate or obovate, serrate, glabrous; flowers in panicled, spreading racemes. Var. *al″ba*, has white petals, and often the twigs are reddish. The small branches are generally killed by frost in the winter, as also of the next species. 2-4 f.

tomento′sa, (steeple-bush, purple hardhack, meadow-sweet, r. Ju. ♄.) leaves lanceolate, unequally serrate, downy beneath, racemes in a crowded, sub panicled spike 2-3 f.

hypericifo′lia, (John's-wort, hard-hack w M. ♄.) leaves obovate, entire or toothed at the apex; umbels sessile. Cultivated. 3 f.

opulifo′lia, (nine-bark, snow ball, har bark, w. J ♄.) leaves sub-ovate, lobed, doubly toothed or crenate, glabrous; corymbs terminal, crowded; capsules inflated; flowers trigynous. Wet. 3-5 f.

crena'ta, (♄.) leaves obovate, crenulate at the apex, acute, 3-nerved; corymbs crowded, peduncled.

capita'ta, (J. ♄.) leaves ovate, somewhat lobed, doubly toothed, reticulate beneath, tomentose; corymbs terminal, crowded, sub-capitate, long-peduncled; calyx tomentose.

sorbifo'lia, (w. Au. ♄.) flowers panicled; leaves pinnate; leafets uniform, serrate. A native of Siberia.

mo'nogy'na, (♄.) leaves glabrous, broad-ovate, sub-3-lobed, gash serrate; corymbs umbelled; pedicels glabrous; segments of the calyx erect, spreading.

2. *Stem herbaceous. Leaves pinnate.*

arun"cus, (goat's beard, w. J. ♃.) leaves 2-3 pinnate, shining; spikes in panicles; styles 3-5. Var. *america'na*, very long, slender spikes. 4-6 f. Mountains.

loba'ta, (r. Ju. ♃.) leaves glabrous, terminal one large, 7-lobed, lateral ones 3-lobed; corymbs proliferous.

ulma'ria, (queen of the meadow, w. Au. ♃.) leaves pinnate, downy beneath; the terminal leafets larger, 3-lobed; the lateral ones undivided; flowers in a proliferous corymb; stem herbaceous. Ex.

betulifo'lia, (r. J. ♄.) leaves glabrous, broad-ovate, gash-toothed; corymbs terminal, compound, fastigiate, leafy. 1 f.

ulmifo'lia, (w.) corymbs fastigiate; leaves large. Ex.

bel"la, (J.) corymbs of beautiful rose-colored flowers. Ex.

ariæfo'lia, (Ju.) a beautiful species, producing loose panicles of feathery, whitish flowers. A native of California.

STA'CHYS. 13—1. (*Labiatæ.*) [From *stachius*, a spike.]

as"pera, (hedge-nettle, clown-heal, w-p. Ju. ♃.) stem erect, hispid backward; leaves sub-petioled, lanceolate, acutely serrate, very glabrous; whorls about 6-flowered; calyx with spreading spines. Var. *tenuifo'lia*, leaves very thin and slender. Fields.

hyssopifo'lia, scarcely pubescent, slender, erect; leaves sessile, lance-linear; whorls about 4-flowered; flowers sessile, purple; corolla little hairy. Meadows.

sylvat"ica, leaves cordate, ovate-acuminate, serrate, hairy; floral ones nearly linear; whorls of 6 flowers; calyx hairy, with 5 acute teeth; flowers purple; lower lip of the corolla whitish with dark spots; fetid. Woods.

veluti'na, (b.) stem simple, quadrangular, villose or sub-hispid; leaves lance-ovate, crenate, serrate, opposite and pointing four ways, clasping, close-sessile; nerves silky-tomentose; whorls about 6-flowered; corolla sub-pilose. 1 f.

pilo'sa, (r. ♃.) hirsutely pilose; leaves sub-sessile, serrate, acute, oblong-ovate; calyx very pilose; whorls somewhat 6-flowered.

latifo'lia, (p. Ju. ♃.) whorls many-flowered, spiked, upper lip 2-cleft with acute segments; leaves broad, cordate, rugose, hairy. Ex.

his"pida, (y-p. Ju. ♃.) stem and leaves hispid; leaves petioled, nearly sessile, ovate-oblong, acute, obtusely serrate; whorls about 4-flowered; calyx glabrous; corolla large, rather longer than the stamens. 2 f. *S.*

tenuifo'lia, stem erect, angled, smoothish; leaves petioled, oval-lanceolate, serrate, acuminate; whorls 6-flowered; calyx very pubescent. 18-24 i. *S.*

interme'dia, (♃.) leaves oblong, sub-cordate, crenate; stem somewhat woolly; whorls many-flowered. *S.*

STAPHYLE'A. 5—3. [From *staphule*, a tumor.]

trifo'lia, (bladder-nut, y-w. M. ♄.) leaves in threes; racemes pendent; petals ciliate below. When the fruit is ripe, it consists of 2 or 3 inflated, adnate, sub-membranous capsules, each containing from 1 to 3 hard, small nuts. 6-12 f.

STAT"ICE. 5—5. (*Plumbagines.*)

limoni'um, (marsh-rosemary, sea-lavender, Au. ♃.) scape paniculate, terete; leaves radical, linear, flat, smooth; flowers sessile, secund, in a very large and much-branched panicle. Salt marshes.

arme'ria, leaves all radical, linear, flat; scape bearing a round head of rose-colored flowers, which are intermixed with scales, and have a 3-leaved, general involucre. Rocks near the seashore. Striped.

STELLA'RIA. 10—3. (*Caryophylleæ.*) [From *stella*, a star so called from the starlike appearance of its flowers.]

me'dia, (chickweed, w. M. to Nov. ☉.) stem procumbent, with pubescent leaves on opposite sides; peduncles axillary and terminal, 1-flowered; petals white, deeply cleft; stamens 5-10. 9-13 i. Road-sides.

lanceola'ta, (♃.) leaves lanceolate, acute at each end; petals about as long as the calyx; stigmas mostly 4, or wanting; flowers solitary, axillary, and terminal, on slender peduncles. 6-18 i.

longifo'lia, (long-leafed starwort,) leaves linear, acute, spreading, with the margins often scabrous; panicle very long; petals 2-parted, broad-obovate. 12-15 i. Moist woods.

pu'bera, (w. M. ♃.) pubescent; leaves sessile, ovate, ciliate; pedicels dichotomous, recurved; petals longer than the calyx. 6-12 i.

borea'lis, (w. Ju.) stem angular, dichotomous; leaves lance-oval; peduncles axillary, elongated, flowered; petals deeply cleft, about equal to the calyx. White Mountains.

lon"gipes, (w.) weak, very glabrous, glaucous; leaves linear, subulate, spreading; peduncles terminal, dichotomously branched; bracts membranaceous; pedicels much elongated; petals broad-ovate, deeply bifid, a little longer than the obscurely 3-nerved calyx. Woods near Lake Ontario.

prostra'ta, (Ap. ☉.) stem slightly char celled, prostrate, hollow, forked, sub-pubescent; peduncles solitary, long; flowers small, heptandrous; calyx erect. 1-4 f. *S.*

jamesia'na, viscid-pubescent; leaves lanceolate, sub-falcate, sessile, acute; stem somewhat branched, weak; panicles lax, divaricate; petals 2-lobed, about twice the length of the oblong-acute divisions of the calyx. *S.*

gla'bra, (w. M.) stem slender, glabrous; leaves subulate-linear, expanding; peduncles erect, axillary, 1-flowered; petals emarginate, much longer than the calyx.

STE'VIA. 17—1. (*Corymbiferæ.*) [After an eminent Spanish botanist.]

callo'sa, (r. ⊙.) leaves linear, crowded, somewhat succulent, callous at the apex; upper ones alternate; flowers divaricate, sub-corymbed; egret about 8 leaved, erose, short. *S.*

STILLIN"GIA. 19—15. (*Euphorbiæ.*) [From Stillingfleet, who wrote on gardening in 1759.]

sylvat"ica, (y. J. ♃.) herbaceous; leaves sessile, oblong-lanceolate, serrulate; scaly bracts nearly as long as the staminate flowers. *S.*

sebif"era, (Ju. ♄.) leaves rhomboid, acuminate, entire, with a gland below the base on the petiole; staminate flowers pedicelled. Introduced. 20-40 f. *S.*

ligustri'na, (Ju.) fruticose; leaves lanceolate, tapering at each end, glabrous, entire, petioled; staminate florets short-pedicelled. 6-12 f. *S.*

STI'PA. 3—2. (*Gramineæ.*)

avena'cea, (feather grass, M. ♃.) stem terete, glabrous; leaves striate, glabrous; panicle spreading; branches whorled with branchlets; awns naked, twisting. Var. *bi'color*, fruit bearded at the base, obovate. *S.*

stric"ta, panicle long, narrow; peduncles very straight, jointed; awns naked; somewhat flexuous. *S.*

STI'PULICI'DA. 3—1. (*Amaranti.*) [From *stipulæ*, the stipule, and *cædo*, to cut, the stipule being divided into many segments.]

seta'cea, (w. M.) erect, smooth, branched; lower leaves small, opposite, spatulate; on the branches none; at each fork 2 fimbriate stipules. 6-10 i. *S.*

STOKE'SIA. 17—1. (*Corymbiferæ.*) [After John Stokes, an eminent botanist.]

cya'nea, (b. ♃.) stem leafy; leaves lanceolate; peduncles axillary, 1-flowered. *S.*

STREPTAN"THUS. 14—2. (*Cruciferæ.*)

sagitta'tus, (r. ⊙.) leaves sagittate, acute, clasping, entire; petal oblong-oval, not maculate.

ovalifo'lius, (Arkansas cabbage,) leaves oval. Grows in Arkansas.

STREPTO'PUS. 6—1. (*Liliaceæ.*) [From *streptos*, twisted, *pous*, foot.]

ro'seus, (r. M. ♃.) smooth and shining; stem dichotomous, terete; leaves clasping, serrulate, ciliate; anthers short, 2-horned. 12-18 i. Mountains.

distor"tus, (g-y. M. ♃.) pedicels distorted or twisted, and geniculate in the middle; anthers much longer than the filaments. 2 f. Shady, alpine woods.

lanugino'sus, hoary-pubescent; flowers greenish, larger than the preceding. Mountains.

STROPHOS"TYLES. 16—10. (*Leguminosæ.*)

angu'losa, (p. Au. ⊙.) leaves ternate; leafets angular, 2-3-lobed; peduncles longer than the leaves; flowers capitate.

helvo'la, flowers red, prostrate, sometimes twining; leaves ternate, deltoid-oblong; flowers capitate; banner short; wings large, expanded.

STUAR"TIA. 15—12. (*Malvaceæ.*)

pentagy'na, (w-y. Ju.) sepals lanceolate styles distinct; capsules 5-angled; leaves oval or ovate, acuminate, entire or mucronately serrulate, somewhat pubescent beneath. N. C. to Geor.

virgin"ica, (w. M. ♄.) leaves ovate, acuminate; flowers axillary; calyx ovate; petals entire. 6-12 f. *S.*

STYL"IPUS. 11—12. (*Rosaceæ.*) [From *stulos*, column, from the receptacle being columnar.]

ver"na, (y. J. ♃.) sparingly pubescent; radical leaves interruptedly pinnate; cauline ones pinnate and pinnatifid; leafets gash-toothed; stem procumbent at the base branching above; stipules large, roundish gash-toothed; petals longer than the calyx awns naked; flowers small.

STYLOSAN"THES. 16—10. (*Leguminosæ.*) [From *stulos*, a column, and *anthos*, flower.]

ela'tior, (pencil-flower, y. Au. ♃.) stem pubescent on one side; leaves glabrous, lanceolate; bracts ciliate; heads 2-3-flowered. 9-15 i.

STY'RAX. 15—12. (*Malvaceæ.*) [Name from the Greek.]

grandifo'lium, (w. Ap. ♄.) leaves obovate, acuminate, tomentose beneath; racemes simple, axillary, leafy near the base. 4-12 f. *S.*

ben"zoin, a tree producing a balsam, the preparations of which are much used for medicinal purposes.

læ've, (w. Ap. ♄.) branches virgate, slightly geniculate; leaves lanceolate, acuminate at each end, serrate, glabrous; racemes lateral, leafy; flowers axillary and terminal; corolla tomentose. 4-6 f. *S.*

pulverulen"tum, (w. Ap. ♄.) leaves oval, acute, tomentose beneath; racemes lateral, leafy, few-flowered; corolla very fragrant. 18 i. *S.*

gla'brum, (w. Ap. ♄.) branches diffuse, spreading; leaves oval-lanceolate, acute at each end, finely serrulate, membranaceous, glabrous, thin; racemes lateral, leafy; corolla large. 6-8 f. *S.*

SUBULA'RIA. 14—1. (*Cruciferæ.*) [From *subula*, an awl.]

aquat"ica, (w. Ju. ⊙.) scape 1-2 inches high; radical leaves entire, subulate. Water.

alpi'na, (♃.) stem branching; leaves obovate. *S.*

SWER"TIA. 4—1. (*Gentianeæ.*) [Name from Emanuel Swert.]

deflex"a, (g. y. Au ♂.) stem 4-sided

branches short; leaves opposite, sessile, ovate; corolla bell-form, with horns. 18 i. Swamps.

pusil″la, (false gentian, b. J. ☉.) corolla rotate twice as long as the calyx; stem simple, 1-flowered; leaves oblong. 1 i. High mountains.

fastigia'ta, (Ju. ♃.) stem branching; corolla bell-wheel-form; flowers fastigiate, clustered; pedicels in pairs; leaves spatulate-obovate, nerved. *S.*

SYE'NA. 3—1. (*Narcissi.*) [In honor of Syen, superintendent of the garden at Leyden.]

fluvia'tilis, (J. ♃.) leaves crowded, subulate; flowers axillary, solitary, long-peduncled; peduncle recurved after flowering. 2-3 i. *S.*

SYM″PHITUM. 5—1. (*Boragineæ.*) [From *sumphio*, to unite, because it was supposed to heal wounds.]

officina'le, (comfrey, y-w. J. ♃.) leaves ovate-sub-lanceolate, decurrent, rugose. Naturalized. 2-4 f.

SWIETE'NIA. 10—1. (*Meliæ.*) [So named from Van Swieten, to whom a statue was erected by the Emperess Maria Theresa.]

mahogan″ii, leaves lanceolate-ovate, acuminate; racemes axillary, pubescent. Mahogany-tree. *S.*

SYMPHO'RIA. 5—1. (*Caprifoliæ.*) [From the Greek, signifying a cluster.]

glomera'ta, (r-y. Au. ♄.) racemes axillary, capitate, glomerate; leaves opposite, ovate, on short petioles; flowers small, numerous; berries purple. 3-4 f. Sandy fields. Penn. to Car.

racemo'sa, (r. Ju. ♄.) racemes terminal; corolla bearded within; leaves elliptical, ovate, opposite; corolla pale red; berries white. 2-3 f. Snow-berry.

occiden″ta'lis, leaves very large; racemes drooping.

SYNAN″DRA. 13—1. (*Labiatæ.*) [From *sun*, together, and *aner*, stamens; so called because the anthers cohere.]

grandiflo'ra, (y-w. J. ♃.) leaves cordate, ovate, acuminate, upper ones sessile, clasping; lower ones sessile, sub-petioled; flowers solitary sessile. 1 f. *S.*

SYRIN″GA. 2—1. (*Jasmineæ.*) [From a Turkish word, signifying pipe, because pipes were made from its branches.]

vulga'ris, (lilac, b-p. w. M. ♄.) leaves cordate; flowers in a thyrse. Ex.

per″sica, (Persian lilac, b. M. ♄.) leaves lanceolate, entire, and pinnatifid. Ex.

chinen″sis, (Chinese lilac, b. M. ♄.) branches rigid, mottled; leaves lanceolate. Ex.

TAGE'TES. 17—2. (*Corymbiferæ.*)

erec″ta, (African marygold, y. Ju. ☉.) leaves pinnate; leafets lanceolate, ciliate, serrate; peduncles 1-flowered, incrassate, sub-inflated; calyx angled. Ex.

pat″ula, (French marygold, y Ju. ☉.) stem spreading; leaves pinnate, leafets lanceolate ciliate-serrate; peduncles 1-flowered, sub-incrassate; calyx smooth. Ex.

TALI'NUM. 12—1. (*Portulacceæ.*)

teretifo'lium, (p. Ju. ♃.) leaves terete subulate, fleshy; cyme terminal, dichotomous, corymbose; flowers pedunculate polyandrous. 4-10 i. Rocks. Penn. to Va.

parviflo'rum, small; leaves slender; stamens 5-10. Ark.

TAMARIN″DUS. 15—3. (*Leguminosæ.*) [From the Arabic *tamarhindi*, or Indian date.]

in″dica, (tamarind,) leaves abruptly pinnate; leafets 16-18 pairs, downy, obtuse entire; flowers lateral, yellow; pods brown. Ex.

TANACE'TUM. 17—2. (*Corymbiferæ.*) [A corruption of *athanasia*, an ancient name for tansey.]

vulga're, (tansey, y. Ju. ♃.) leaves doubly-pinnate, gash-serrate. Naturalized. Var. *cris'pum*, (double tansey,) leaves crisped and dense.

huronen″sis, (y. ♃.) flowers large, corymbed; ray-florets irregular, 4-5-cleft; leaves pseudo-bi-pinnate, gash-serrate, subtomentose beneath; pedicels thickened.

TAX″US. 20—15. (*Coniferæ.*)

canaden″sis, (yew, Ap. ♄.) leaves linear distichus, revolute on the margin; receptacle of the staminate flowers globose. 4-8 f.

bacca'ta, (the common English yew,) leaves flat, dark green, smooth and shining above; flowers imbricated; berries scarlet.

TEPHRO'SIA. 16—10. (*Leguminosæ.*) [From *tephros*, ash colored, alluding to the foliage.]

virginia'na, (goat's-rue, r. Ju. ♃.) erect, villose; leafets numerous, oblong-lanceolate, acuminate; raceme terminal, sub-sessile; legumes falcate, villose. 1 f. Dry woods.

hispid″ula, (r. M. ♃.) stem slender, very much divided, pubescent; leaves pinnate; leafets (11-15) elliptic, sub-retuse, mucronate, hairy beneath; racemes as long as the leaves, few-flowered; pods mucronate, slightly hispid. 2 f. *S.*

paucifo'lia, (r. J. ♃.) stem generally decumbent, very villose; leaves scattered, pinnate; leafets oval, cuneate at base, villose beneath; peduncles much longer than the leaves; few-flowered. *S*

chrysophyl″la, (Ju.) prostrate, pubescent; leaves pinnate by fives, sub-sessile; leafets cuneate, obovate, obtuse, coriaceous, glabrous above, silky beneath; peduncles opposite the leaves, long, about 3-flowered; pods nearly straight. *S.*

ele'gans, (r-p. ♃.) decumbent, sparingly pubescent; leaves sub-sessile; leafets (15-17) oblong-oval; peduncles filiform, few-flowered; segments of the calyx acuminate. Ala.

TEU'CRIUM. 13—1. (*Labiatæ.*) [From Teucer, who is said to have been its discoverer.]

canaden″se, (wood-sage, germander, r. Ju. ♃.) pubescent; leaves lance-ovate, serrate, petioled; stem erect; spikes whorled, crowded, bracts longer than the calyx. Var. *virgin″icum*, upper leaves sub-sessile; bracts about the length of the calyx. 1-3 f.

lancinia'tum, somewhat pubescent; leaves pinnately 5 parted; upper ones 3-parted, segments linear; flowers axillary, solitary pedicelled; pedicels much shorter than the leaves.

beton″icum, has loose spikes of fragrant crimson flowers. Ex.

THA'LIA. 1—1. (*Orchideæ.*) [In honor of John Thalius.]

dealba'ta, (p. Au. ♃.) spatha 2-flowered; leaves ovate, revolute at the summit; panicle white-pulverulent. *S.*

THALIC″TRUM. 12—12. (*Ranunculaceæ.*) [From *thallo*, to flourish.]

dio'icum, (meadow rue, w-r. M. ♃.) flowers diœcious; filaments filiform; leaves about 3-ternate; leafets roundish, cordate, obtusely lobed, glabrous; peduncles axillary, shorter than the leaves. 1-2 f.

pubes″cens, (w. Au. ♃.) leafets woolly, lobed, margin revolute, finely pubescent beneath.

cornu'ti, (g-y. Ju. ♃.) leaves decompound; leafets ovate, obtusely 3-lobed, glaucous beneath, with the nerves scarcely prominent; flowers mostly diœcious; filaments sub-clavate; fruit sessile, striate. 2-5 f. Wet grounds.

clava'tum, (♃.) leaves glabrous, without stipes; flowers monœcious; filaments clavate; pericarp compressed, with a very short style. *S.*

alpi'num, a dwarf species.

THAS″PIUM. 5—2. (*Umbelliferæ.*) [From the isle of Thaspia.]

actæifo'lium, (Ju. ♃.) leaves gash-biternate; segments oval, equally dentate; umbels sub-verticillate; lateral ones sterile. 3 f. Canada.

atropurpu'reum, (p. J. ♃.) radical leaves petioled, cordate, undivided; cauline ones gash-pinnate; segments 3 to 7, short petioled, ovate, oblong, all cartilaginous-dentate. 2-3 f.

THE'A. 12—1. (*Meliæ.*) [A Chinese name.]

bohe'a, (bohea tea, M. ♄.) flowers 6-petalled; leaves oblong-oval, rugose. From China and Japan.

vir″idis, (green tea, ♄.) flowers 9-petalled; leaves very long-oval. Ex.

THER″MIA. 10—1. (*Leguminosæ.*) [From *thermos*, temperature; a plant of warm climates.]

rhombifo'lia, (y. ♃.) leaves ovate-rhomboid, silky-pubescent beneath; stipules leaf-like, round, ovate, oblique, shorter than the petiole; flowers racemed. *S.*

THE'SIUM. 5—1. (*Æleagni.*) [From a Greek word signifying garland.]

umbella'tum, (false toad-flax, w. g. J. ♃.) erect; leaves oblong; umbels axillary, 3-5-flowered; peduncles longer than the leaves. 9-15 i.

THLAS″PI. 14—1. (*Cruciferæ.*) [From *thlao*, to break, so called because it appears broken.]

bursa-pasto'ris, (shepherd's-purse, w. M. ⊙.) hirsute; silicles deltoid, obcordate; radical leaves pinnatifid.

arven″se, (penny-cress, w. J. ⊙.) leaves oblong, sagittate, coarsely toothed, smooth; pouch sub-orbicular, shorter than the pedicel; its wings dilated longitudinally; flowers in a raceme. 1 f.

tubero'sum, (Ap. ⊙.) flowers large, rosaceous; stem 1-5 inches high, simple, pubescent; upper leaves sessile, radical leave long-petioled; root tuberous, pouch orbicular.

allia'ceum, (⊙.) leaves oblong, obtuse dentate, glabrous; silicle sub-ovate, ventricose. Introduced.

THU'JA. 19—15. (*Coniferæ.*) [From *thuo* odor, so called from its fragrant smell.]

occidenta'lis, (American arbor-vitæ, M ♄.) branches ancipetal; leaves imbricated, in 4 rows, ovate-rhomboidal; strobiles obovate. Mountains. A small tree with very tough branches. Leaves resembling scales.

gigan″tea, leaves imbricate 4-ways, ovate, obtusish, closely incumbent, sub-equal; strobiles loose; scales oboval, 200 feet high, and 12 feet in diameter.

articula'ta, produces the gum Sandarach. the wood is said to resist fire, and is also supposed to be the sandal-wood of the ancients.

THY'MUS. 13—1. (*Labiatæ.*) [From *thuma* odor.]

vulga'ris, (thyme, b-p. J. ♃.) erect; leaves ovate and linear, revolute; flowers in a whorled spike. Ex.

serpyl″lum, (wild thyme, b-p. J. ♃.) stems branched, creeping; leaves elliptic-ovate obtuse, flat, petioled, ciliate at base; flowers capitate. 4-8 i. Naturalized.

lanugino'sus, (lemon thyme, ♃. ♄.) stem creeping, hirsute; leaves obtuse, villose: flowers capitate. Ex.

grandiflo'ra, very ornamental. Ex.

THY'SANOCAR″PUS. 14—1. (*Cruciferæ.*) [From *thasanos*, fringe, and *karpos*, fruit the pods having fringe on the edge.]

curvi'pes, flowers racemed, small; leave mostly radical, pinnatifid; silicle pendulous stem solitary, erect. West of Rocky Mountains.

oblongifo'lius, silicles nearly orbicular wingless, hispid, with uncinate hairs; petals about half as long as the calyx; leaves oblong, toothed, densely and stellately hirsute. Oregon.

TIAREL″LA. 10—2. (*Saxifragæ.*) [From *tiara*, an ornament for the head.]

cordifo'lia, (mitre-wort, w. M. ♃.) leaves cordate, acutely lobed, dentate; teeth mucronate; scape racemed; petals with long claws; flowers in a simple terminal raceme Shady woods. 8-10 i.

menzie'sii, (♃.) leaves ovate, heart-shaped, acute, lobes short, dentate; cauline ones alternate, distant; raceme filiform somewhat spiked; calyx tubular. 1 f.

trifolia'ta, (♃.) leaves ternate; leafets sub-rhomboid, serrate, pilose; racemes terminal; small corymbs of flowers alternate calyx campanulate.

TIGA'REA. 11—1. (*Rosaceæ.*)

tridenta'ta, (y. Ju. ♄.) leaves crowded towards the ends of the branches, 3-toothed, villose above, hoary-tomentose beneath, flowers terminal, solitary. *S.*

TI'GRIDIA. 15—3. (*Irideæ.*) [So called from its spotted appearance, resembling a tiger.]

ensifor″mis (tiger flower,) spatha 2-leav ed; two outer petals longer than the other four; leaves ensiform, nerved. Mexico.

TIL''IA. 12—1. (*Tiliaceæ.*) [From *ptelea*, the Greek name.]

gla'bra, (bass-wood, lime-tree, y-w. Ju. ♄.) leaves round-cordate, abruptly acuminate, sharply serrate, sub-coriaceous, glabrous; petals truncate at the apex, crenate; style about equalling the petals; nut ovate. Large tree. Wood soft and white. Leaves often truncate at the base.

pubes'cens, (y-w. Ju. ♄.) leaves truncate at the base, sub-cordate, oblique, denticulate-serrate, pubescent beneath; petals emarginate; nut globose, smooth. Var. *leptophyl''la*, leaves lax, serrate, very thin.

laxiflo'ra, (M. ♃.) leaves cordate, gradually acuminate, serrate, membranaceous, smooth; panicles loose; petals emarginate; styles longer than the petals; fruit globose. Near the seacoast.

heterophyl''la, (J ♄.) leaves ovate, at base oblique or equally truncate and cordate, serrate, white-tomentose beneath; fruit globose. *S.*

TILLAND''SIA. 6—1. (*Narcissi.*) [Named from Tillandsius, professor of Medicine at Albo.]

utricula'ta, (wild pine, bladder tillandsia, w.) leaves concave, broad, their base enlarged; panicle branching; flowers sessile; stamens longer than the corolla. 3 f. The leaves are often found containing nearly a pint of water. *S.*

usneoi'des, stem gray, diffuse, filiform, pendulous, branching. Parasitic. From its peculiar appearance, suspended from trees to which it has fastened itself, it is called *old man's beard.*

recurva'ta, (p.) leaves subulate, recurved; scape setaceous, longer than the leaves, generally 2-flowered at the summit. *S.*

TIPULA'RIA. 18—1. (*Orchideæ.*)

disco'lor, (w. Au.) leaf solitary, plaited, and longitudinally-nerved; flower in nodding racemes.

TOFIEL''DIA. 6—3.

pubes''cens, (p-w. Ju. ♃.) leaves sub-radical, ensiform, narrow, smooth; rachis and pedicels scabrous; spike oblong, interrupted; scape 18 i. Swamps.

glutino'sa, (♃.) scape and pedicels glutinous, scabrous; spike with a few alternate fascicles; capsule ovate, twice the length of the calyx.

glaber''rima, (w. Oc. ♃.) very glabrous; leaves linear, gladiate; flowers racemed; buds approximate, nearly whorled; 1-flowered. *S.*

gla'bra, (g-w.) scape terete; leaves linear, ensiform; spike oblong, short, dense; peduncled, solitary, angular; capsules membranaceous. 8-10 i. *S.*

TRADESCAN''TIA. 6—1. (*Junci.*) [From John Tradescant.]

virgin''ica, (spider-wort, b-p. M. ♃.) erect, branching; leaves lanceolate, elongated, glabrous; flowers sessile; umbel compact, pubescent. Cultivated. 1-2 f.

rose'a, flowers smaller than the preceding; inner segments rose-colored, longer than the outer.

TRA'GIA. 19—3. (*Euphorbeæ.*) [Named after a famous German herbalist.]

ramo'sa, stem herbaceous, pilose, very branching; leaves petioled, lance-ovate sharply serrate, hirsute beneath, sub-cordate at the base; racemes axillary, filiform, few-flowered. 8 i.

u'rens, (Ju. ♃.) erect; leaves lanceolate, sessile, obtuse, sub-dentate at the apex; stem and branches pubescent. Var. *subova'lis*, leaves oblong-oval, sometimes wedge-form. Var. *lanceola'ta*, leaves lanceolate sub-dentate, and entire. *S.*

urticifo'lia, (Ju. ☉.) stem erect, hirsute, leaves cordate, ovate, serrate, alternate. short-petioled. 12-18 i. *S.* Dry soils.

macrocar''pa, (Ju. ☉.) climbing, hispid; leaves deeply cordate, ovate, dentate. *S*

TRAGOPO'GON. 17—1. (*Cichoraceæ.*) [From *tragos*, a goat, and *pogon*, beard, so called from its downy seed.]

porrifo'lium, (vegetable-oyster, goat-beard, salsify, p. Ju. ♂.) calyx longer than the rays of the corolla; the florets very narrow, truncate; peduncles incrassate. Ex.

pra'ten''sis, (go-to-bed-at-noon, y. ♂.) has large flowers, which close in the middle of the day, and a curious, feathery head of seeds. Ex.

TRE'POCAR''PUS. 5—2. (*Umbelliferæ.*)

æthu'sæ, (w.) umbels 5-rayed; fruits four times as long as broad; leaves many-cleft, with linear lobes. Arkansas.

TRIB''ULUS. 10—1. (*Rutaceæ.*)

max''imus, (y. Ju.) leaves pinnate; leafets about 4-pairs, outer ones largest; pericarps 10-seeded, not spiny. 1-2 f.

trijuga'tus, (y. ☉.) leafets in 3 pairs, terminal ones largest, pubescent beneath; capsules 5, 1-seeded, muricate, spineless.

TRI'CHO'PHYL''LUM. 17—2. (*Corymbiferæ.*) [From *thrix*, hair, and *phullon*, a leaf.]

lana'tum, (y. Ju. ♃.) woolly in all parts; leaves linear, pinnatifid above; peduncles elongated, 1-flowered; rays 2-toothed; akenes glabrous, 5-angled.

oppositifo'lium, (Ju. ♃.) decumbent, branching, short, hoary-pubescent; leaves opposite, palmate, 3-cleft; segments ligulate, simple, or divided; peduncle filiform, mostly dichotomous, scarcely longer than the leaves. 6-12 i. *S.*

TRICHOSTE'MA. 13—1. (*Labiatæ.*) [From *trichos*, hair, and *stema*, stamens.]

dichot''oma, (blue curls, b. Au. ☉.) leaves lance-ovate; branches flower-bearing, 2-forked; stamens very long, blue, curved. Var. *linea'ris*, somewhat pubescent; leaves linear. 6-12 i.

TRIENTA'LIS. 7—1. (*Lysimachiæ.*)

america'na, (chick wintergreen, w. Jy ♃.) leaves lanceolate, serrulate, acuminate petals acuminate. 3-6 i.

TRIFO'LIUM. 16—10. (*Leguminosæ.*) [From *tres*, three, *folium*, leaf.]

re'pens, (white-clover, w. M. ♃.) creeping; leafets ovate-oblong, emarginate, serrulate; flowers in umbelled heads; teeth of the calyx sub-equal; legumes 4-seeded.

praten"se, (red-clover, r. M. ♃.) ascending, smooth; leafets ovate, sub-entire; stipules awned; spikes dense-ovate; lower tooth of the calyx shorter than the tube of the corolla, and longer than the other teeth. 2-3 f.

arven"se, (rabbit-foot, w. J. ☉.) heads very hairy, oblong-cylindrical; teeth of the calyx setaceous, longer than the corolla; leafets villose, narrow, obovate; banner deciduous. 6-12 i.

reflex"um, (r. J. ♃.) pilose; stem ascending; leafets obovate; stipules oblique, cordate; heads globose; flowers pedicelled; at length reflexed. 12—18 i. Dry hills.

agra'rium, (y. J. ☉.) stem ascending, with erect branches; leafets lanceolate-cuneate, obtuse, intermediate one sessile; stipules lanceolate, acute; heads oval, imbricate; banner deflexed, persistent; teeth of the calyx subulate, glabrous, unequal. 6-14 i. Sandy soils.

campes"tre, (y. J. ☉.) stem sub-diffuse; branches decumbent; spike ovate, imbricate; banner deflexed, persistent; leafets lanceolate-ovate, intermediate one petioled.

stolo'nif"erum, (running buffalo-clover, w. J. ♃.) stoloniferous, glabrous; lower leaves long-petioled; leafets obovate or cuneate, serrulate, retuse or emarginate at the apex; stipules membranaceous, broad-lanceolate; flowers in globose heads, pedicelled, erect, at length reflexed; segments of the calyx nearly equal, narrow, smooth, longer than the tube. 4-8 i.

procum"bens, (yellow clover, y. J. ☉.) procumbent, pubescent; leafets oval; peduncles long, setaceous; racemes short; loments sub-orbicular. 2-3 f.

carolin"ia'num, (p-w. Ap. ♃.) small, procumbent; leafets obcordate (the upper one only emarginate), ternate, hairy, dentate; stipules 2-cleft; heads capitate, peduncled, reflexed, few-flowered; corolla scarcely exserted, legumes 3-4 seeded. 3-10 i. *S.*

TRIGLO'CHIN. 6—3. (*Junci.*)

palus"tre, (arrow-grass, g. Ju. ♃.) fruit 3 united capsules, nearly linear, attenuated at the base; scape very slender, 1 foot long; leaves fleshy, nearly as long as the scape; flowers, small, greenish, in a terminal spike. Marshes.

marati'mum, fruit of 6 united capsules, ovate-oblong. Salt marshes.

triand"rum, (Ju.) triandrous; flowers 3-cleft, short-pedicelled; leaves terete, linear. 6-9 i.

TRI'GONEL"LA. 16—10. (*Leguminosæ.*) [Alluding to its little triangular flower.]

fæ'num-græ'cum, (fenu-greek, ☉.) stem erect; leaves wedge-oblong; legumes sessile, solitary, straight, erectish, sub falcate, acuminate.

seri'cea, (y. Ju. ☉.) leaves ternate, sessile, oblong, acute, silky villose; peduncles axillary, 1-flowered, longer than the leaf; flowers 1-bracted; divisions of the calyx linear; legume glabrous, very long. *S.*

TRIL"LIUM. 6—3. (*Asparagi.*) [From *trilex*, triple.]

pen"dulum, (nodding wake-robin, w. M. ♃.) peduncles erect, with the flower a little nodding; petals ovate, shortly acuminate, spreading, flat, longer than the calyx; leaves rhomboid, acuminate, sessile.

erec"tum, (false wake-robin, p. w-y. M. ♃.) peduncles erect or erectish, with the flowers a little nodding; petals ovate, acuminate, spreading, equalling the calyx; leaves rhomboid, acuminate. Var. *atropurpu'reum*, petals large, dark-purple. Var. *al"bum*, petals smaller, white; germ red. Var. *fla'vum*, petals yellow; both petals and calyx leaves longer and narrower. 12-18 inches high; leaves often 3-4 inches broad; peduncles about 3 inches long. 9-16 i.

ses"sile, (p. Ap. ♃.) leaves sessile, broad-ovate, acute; flowers closely sessile; petals lanceolate-ovate, very acute, alternate at base, erect, as long as the recurved calyx; stem smooth, 8-10 i. Leaves clouded with dark-green. Shady woods.

viri'de, leaves solitary, with whitish spots on the upper surface; petals dark-green.

pic"tum, peduncle somewhat erect; leaves ovate, acuminate, rounded at the base, abruptly contracted into a short petiole; flowers white, with purple veins near the base

cer"nuum, (w. M. ♃.) peduncle recurved; petals lanceolate, acuminate, flat, recurved, as long as the calyx; leaves rhomboid, on short petioles; flowers small, berries red. 12-18 i.

grandiflo'rum, peduncle a little inclined, nearly erect; flower solitary; petals spatulate, connivent at the base, much longer than the calyx; leaves broadly rhomboid, ovate, sessile, abruptly acuminate. Rocky banks of streams. Flower much larger than in any of the preceding species, varying from white to rose-color; stem 8-12 i.

petiola'tum, (p. J. ♃.) leaves long-petioled, lance-oval, acute; flowers sessile, erect; petals lance-linear, erect, a little longer than the calyx.

pusil"lum, (dwarf wake-robin, r. M. ♃.) leaves oval-oblong, obtuse, sessile; peduncle erect; petals scarcely longer than the calyx.

obova'tum, (r. w. ♃.) leaves rhomb-ovate acuminate, close sessile; peduncles erect; petals obovate, obtusish, flat, spreading.

stylo'sum, (w-r.) slender; leaves subpetioled, lance-oval, acute at both ends, peduncle much shorter than the flower, recurved; petals undulate, expanding, oblong-obtuse, larger than the calyx; germ styliferous; style 1. 8-10 i. *S.*

nervo'sum, (r-w. M.) leaves lanceolate and ovate, acute at each end, membranaceous, nerved; peduncle recurved; petals lance-oblong, larger than the calyx. 6-8 i. *S.*

ova'tum, (p. Ap. ♃.) leaves ovate, gradually acute, closely sessile; peduncle erect, petals oblong, acute, expanding, a little longer than the linear sepals. *S.*

TRIOS"TEUM. 5—1. (*Caprifolia.*)

perfolia'tum, (fever-root, p. J. ♃.) leaves connate, spatulate, lanceolate, acuminate, pubescent beneath, margin undulate; flowers 1-3, in the axils of the leaves, sessile berries purple, or yellow; the root is medi

cinal. Rocky woods. 2-3 feet high. N. Y. to Car.
angustifo'lium, (y. Ju. ♃.) stem hairy; leaves sub-connate, lanceolate, acuminate; peduncles opposite, 1-flowered. 2-3 f. S.

TRIPHO'RA. 18—1. (*Orchideæ.*) [From the Greek, signifying to bear three flowers.]
pen″dula, (p. S. ♃.) root tuberous; stem leafy, about 3-flowered at the summit; leaves ovate, alternate; flowers pedunculate; stems often in clusters. 4-6 i. Roots of trees.

TRIP″SACUM. 19—3. (*Gramineæ.*)
dactyloi'des, (sesame grass, J. ♃.) spikes numerous (3-4), aggregate; florets staminate near the summit, pistillate below; spike large. Var. *monosta'chyon,* spike solitary.
cylin″dricum, spike solitary, cylindrical, separating into short joints; flowers all perfect.

TRIT″ICUM. 3—2. (*Gramineæ.*) [From *tero,* to thresh.]
hyber″num, (winter-wheat, J. ♂.) calyx glume 4-flowered, tumid, even, imbricate, abrupt, with a short compressed point; stipule jagged; corollas of the upper florets somewhat bearded. There are several varieties of this species which were introduced by culture. Ex.
æsti'vum, (summer wheat, J. ☉.) glumes 4-flowered, tumid, smooth, imbricated, awned. Considered a variety of the *hyber″num.*
compos″itum, (Egyptian wheat,) spike compound; spikelets crowded, awned. Few species of wheat, but many varieties.
tri'colo'rum, stem slender, weak; flowers red, black, and yellow. Ex.
re'pens, spikelet oblong, 5-flowered; glumes subulate, many-nerved; florets acuminate; leaves flat; root creeping. Fields. A troublesome weed.
pauciflo'rum, spike erect, simple; spikelets about 2-flowered; culm terete, simple, leafy, striate, smooth; leaves somewhat glaucous, ribs and margin scabrous. 2 f.

TROL″LIUS. 12—12. (*Ranunculceæ.*) [From the German, signifying to roll; so called from the roundness of the flower.]
america'nus, (globe-flower, y. M. ♃.) leaves palmate; sepals 5-10, spreading; petals 5-10, shorter than the stamens; flowers large, terminal; resembles a ranunculus. Wet grounds.

TROPÆO'LUM. 8—1. (*Gerania.*) [From *tropaion,* a warlike trophy.]
ma'jus, (nasturtion, Indian cress, y. and r. Ju. ☉. and ♃.) leaves peltate, sub-repand; petals obtuse, some of them fringed. Ex.
peregri'num, (canary-bird flower,) flowers numerous, pale yellow. Ex.

TROXI'MON. 17—1. (*Cichoraceæ.*) [A Greek word, signifying eatable.]
glau'cum, (y. Ju. ♂.) scape 1-flowered; leaves lance-linear, flat, entire, glaucous; divisions of the calyx imbricate, acute, pubescent.

TU'LIPA. 6—1. (*Liliaceæ.*) [The name is said to be of Persian origin, and to signify a turban.]
suave'olens, (sweet tulip, M. ♃.) small stem 1-flowered, pubescent; flowers erect; petals obtuse, glabrous; leaves lance-ovate Ex.
gesneria'na, (common tulip, M. ♃.) stem 1-flowered, glabrous; flower various-colored, erect; petals obtuse, glabrous; leaves lance-ovate. Ex. The various kinds of tulips which are cultivated, are only varieties of the *gesneria'na.*
sylves″tris, (y. wild French tulip,) flowers very fragrant.
præ'cox, (Van Thol's tulip,) a dwarf species, flowers generally in March or April.

TUL″LIA. 13—1. (*Labiateæ.*) [In honor of Prof. Tully, of New Haven, Conn.]
pycnan″themoi'des, (false mountain mint, r-p. Au. ♃.) leaves tapering to the base, remotely toothed, ovate, acuminate, hoary above and glaucous beneath; bracts of the striate calyx subulate. 2-3 f. Tennessee.

TURRI'TIS. 14—2. (*Cruciferæ.*) [From *turris,* a tower.]
ova'ta, (w. M. ♂.) leaves rough, radical ones ovate, toothed, cauline ones clasping.
gla'bra, erect; radical leaves petioled, dentate, upper ones broad-lanceolate, sagittate, glabrous, semi-amplexicaul, glaucous; legume narrow-linear, stiffly erect; petals scarcely longer than the calyx. Naturalized about New Haven. Hudson's Bay.

TUSSILA'GO. 17—2. (*Corymbiferæ.*) [From *tussis,* a cough, and *ago,* to drive away; so called on account of its medicinal properties.]
farfa'ra, (colt's foot, y. Ap. ♃.) scape single-flowered, scaly; leaves cordate, angular, toothed, downy beneath. The flower appears long before the leaves. 4-6 i.
frig″ida, (y. M. ♃.) thyrse fastigiate, many-flowered, bracteate; leaves roundish cordate, unequally toothed, tomentose beneath. 5-10 i. Mountains.
sagitta'ta, (♃.) thyrse ovate, fastigiate; leaves radical, oblong, acute, sagittate, entire; lobes obtuse.

TY'PHA. 19—3. (*Typhæ.*)
latifo'lia, (cat-tail, reed-mace, Ju. ♃.) leaves linear, flat, slightly convex beneath; staminate and pistillate aments close together. Wet. 4-6 i.

UDO'RA. 20—9. (*Hydrocharides.*)
canaden″sis, (w. Au. ♃.) leaves whorled, in threes and fours, lanceolate, oblong or linear, serrulate; tube of the perianth filiform; stem submersed, dichotomous Still waters. Ditch-moss. Can. to Vir

U'LEX. 16—10. (*Leguminosæ.*)
europe'us, (furze M. ♄.) leaves lance-linear, villose; bracts ovate; branchlets erect.
stric″ta, (Irish furze, y.) without spines 8-10 f. Ex.
na'na, (y.) seldom exceeds two feet in height. Gravelly soils. Ex.

UL″MUS. 5—2. (*Amentaceæ.*)
america'na, (elm, white-elm, g-p. Ap. ♄.) branches smooth; leaves oblique at the base, having acuminate serratures a little hooking; flowers pedicelled; fruit fringed with dense down. Var. *pen″dula,* has hanging branches and smoothish leaves. 40-76

f. Flowers appear before the leaves, a magnificent tree.

ful″va, (slippery-elm, M. Ap. ♄.) branches scabrous, white; leaves ovate-oblong; very acuminate, pubescent on both sides; buds tomentose, with a thick tawny wool; flowers sessile, smaller than the white-elm; leaves larger; stamens often 7. The mucilage of the inner bark medicinal.

nemoral″is, (river-elm, Ap. ♄.) leaves oblong, somewhat glabrous, equally serrate, nearly equal at base; flowers sessile.

racemo′sa, (♄.) flowers in racemes; pedicels in distinct fascicles united at their bases; leaves ovate, acuminate, auriculate on one side, doubly serrate, glabrous above, minutely pubescent beneath; stamens 7-10; stigmas 2, recurved.

ala′ta, (whahoo, Mar. ♄.) branches on each side winged with a cork-like bark, leaves nearly sessile, oblong-oval, acute, doubly serrate, nearly equal at base; fruit pubescent, ciliate. 30 f. *S.*

UL″VA. 21—4. (*Algæ.*)

lin″za, frond lance-linear; margin undulate-crisped; about an inch broad, tapering at the base, green. Seashore.

URASPER″MUM. 5—2. (*Umbelliferæ.*) [From *oura*, a tail, and *sperma*, *seed*.]

clayto′ni, (sweet cicely, J. ♃.) leaves compound, hairy; leafets gash-toothed; umbels axillary and terminal, about 5-rayed; style as long as the villose germ, filiform, reflexed. 2 f.

URE′DO. 21—6. (*Fungi.*) [From *uro*, to burn, on account of its burnt color.]

linea′ris, (yellow grain-rust, J. ⊙.) linear, very long, stained yellow, at length but obscurely colored On the culms and leaves of barley, oats, rye, wheat, &c.

UR″TICA. 19—4 (*Urticeæ.*) [From *urendo*, burning; on account of the sensation it causes.]

dio′ica, (common nettle, J. ♃.) leaves opposite, cordate, lance-ovate, coarsely serrate; flowers diœcious; spikes panicled, glomerate in pairs, longer than the petioles. 2-3 f.

pu′mila, (rich-weed, Ju. ⊙.) leaves opposite, ovate, acuminate, 3-nerved, serrate; lower petioles as long as the leaves; flowers monœcious, triandrous, in clustered corymbs, shorter than the petioles; stem succulent, almost transparent. 6-12 i. Wet grounds.

u′rens, (stinging nettle, J. ⊙.) stem hispid; leaves opposite, elliptic, about 5-nerved, acutely serrate; spikes glomerate, in pairs. 12-14 i.

canaden″sis, (Canada nettle, Ju. ♃.) leaves cordate-ovate, acuminate, hispid on both sides; panicles axillary, mostly in pairs, divaricately branched; the lower staminate ones longer than the petioles; upper pistillate ones elongated; stem hispid, stinging. 5-6 f. Var. *divarica′ta* leaves smooth; panicles solitary, spreading. 4-6 f.

chamædroi′des, (Mar. ⊙.) stem glabrous; leaves opposite, sub-sessile, ovate, serrate, strigose beneath; clusters of flowers axillary, sessile, sub-globose, reflexed; prickles stimulant, white. 4-6 i. *S.*

reticula′ta, (r-y.) leaves deep green. A native of Jamaica.

US″NEA. 21—5. (*Filices.*)

plica′ta, frond pendulous, smooth, pale branches lax, very branching, sub-fibrous, the extreme ones capillary; receptacles flat, broad, ciliate; the hairs very slender and long. On trunks and branches of trees, most common on dry, dead limbs of evergreens, from which it often hangs in long, green locks.

UTRICULA′RIA. 2—1. (*Scrophulariæ.*) [From *utriculus*, a little bladder.]

vulga′ris, (bladder-wort, y. Au. ♃.) floating; stem submerged, dichotomous; leaves many-parted, margins bristly; scape 5-9-flowered; upper lip of the corolla entire, broad, ovate; spur conical, incurved; flowers in racemes. Ponds.

stria′ta, floating; scape 2-6-flowered, root furnished with air-vessels; corolla large, yellow striate with red; spur much shorter than the lower lip.

purpu′rea, scapes axillary, generally 2 or 3 inches long; flowers purple. Ponds on mountains. Mass. to Flor.

infla′ta, (y. Au. ♃.) radical leaves verticillate, inflated, pinnatifid at their extremities; lower lip of the corolla 3-lobed spur deeply emarginate. Ponds.

stria′ta, (y. J. ♃.) floating; scape 2-6-flowered; upper lip of the corolla ovate-round, sub-emarginate, margin waved, lower lip 3-lobed, sides reflected; spur straight, obtuse, shorter than the lower lip. Swamps.

gib″ba, (y. Ju. ♃.) floating; scape mostly 2-flowered; spur shorter than the lower lip of the corolla, obtuse, gibbous in the middle. 1-3 i. Ponds.

cornu′ta, (y. Au. ♃.) scape rooting, erect, rigid; flowers 2-3, sub-sessile; inferior lip of the corolla very wide 3-lobed; spur very acute, lengthened out longer than the corolla. 10-12 i. Wet rocks.

persona′ta, (y. ⊙.) scape rooting, many flowered; upper lip of the corolla emarginate, reclined; lower one small, entire, palate large; spur linear-subulate, acutish. Bogs.

seta′cea, (y. J. ♃.) scape rooting, filiform, upper lip of the corolla ovate, lower one deeply 3-lobed; spur subulate, entire. 3-6 i. Swamps.

inte′gra, (y. ⊙.) floating; scape 1-2-flowered; upper lip of the corolla sub-3-lobed, lateral lobes sub-involute; lower lip entire; spur nearly equalling the lower lip. *S.*

biflo′ra, (y. Ju.) spur subulate, obtuse, about as long as the lower lip; scape about 2-flowered; leaves setaceous. *S.*

UVULA′RIA. 6—1. (*Liliaceæ.*) [From *uvula*, a membrane of the throat, the soreness of which this is supposed to heal.]

perfolia′ta, (bell-wort, y. M. ♃.) leaves perfoliate, oval-obtuse (lance-linear or oval-oblong in the young state); corolla bel liliaceous, scabrous or granular within; anther cuspidate. 8-12 i.

sessilifo'lia, (y. M. ♃.) stem smooth; leaves sessile, oval-lanceolate, glaucous beneath; petals flat, smooth within; capsules stiped. 6-12 i.

grandiflo'ra, leaves perfoliate, oblong, acute, perianth smooth within; anthers without awns; nectaries nearly round; pistil shorter than the stamens; whole plant larger than the preceding species.

puber''ula, leaves colored alike on both sides, oval, rounded at the base, somewhat amplexicaul; capsule sessile, ovate. 8-12 i. *S.*

VACCIN''IUM. 10—1. (*Ericeæ.*) [A corruption of *baccinium*, a berry.]

resino'sum, (whortleberry, a. p. M. ♄.) leaves slender, petioled, oblong-oval, mostly obtuse, entire, bedewed with resinous specks beneath; racemes lateral, 1-sided; pedicels short, somewhat bracted; corolla ovate-conic, 5-cornered; berries black. One variety has a yellowish green, and another has a reddish yellow corolla. 1-4 f.

corymbo'sum, (high whortleberry, w. M. ♄.) flower-bearing branches almost leafless; leaves oblong-oval, acute at each end; the young leaves pubescent; racemes short, sessile, bracted; corolla cylindrical-ovate. Swamps and wet woods; 4 to 8 feet high. Berries large, black, sub-acid.

frondo'sum, whortleberry; leaves ovate-oblong, sprinkled with resinous dots, glaucous beneath; racemes lateral, loose, bracted; pedicels long, filiform; corolla ovate, campanulate; berries large, bluish, sweet, ripening later than the other species.

pennsylva'nica, low blue-berry; branches green, angular; leaves sessile, shining; shrub 12-18 i. high, much branched; flowers pale red, 6 to 8 in a fascicle; berries large, blue, somewhat glaucous. Dry hills. N. Y. to Geo.

stamin''eum, (J. ♄. squaw whortleberry.) very branching; leaves glaucous beneath; corolla campanulate, spreading; anthers exserted. 2-3 f. Berries large, greenish white. Dry woods. Car. to Flor.

vitis''idea, (bilberry, w-r. M. ♄.) evergreen; low, leaves punctate beneath, obovate, emarginate, revolute, sub-serrulate; racemes terminal, nodding.

dumo'sum, (bush-whortleberry, w. M. ♄.) branchlets, leaves and racemes sprinkled with resinous dots; leaves obovate, cuneate at base, mucronate, entire; racemes bracted; pedicels short, axillary, sub solitary; corolla campanulate; segments rounded; anthers included. Var. *hirtel''lum*, racemes and calyx pilose; berries hispid. 12-18 i. Pine woods.

ligustri'num, (p. r. J. ♄.) branches angular; leaves sub-sessile, erect, lanceolate, mucronate, serrulate; fascicles gemmaceous, sessile; flowers nearly sessile; corolla urceolate. Dry woods.

uligino'sum, (b. r-w. Ap. ♄.) leaves obovate, obtuse, entire, smooth above, veined and glaucous beneath; flowers sub-solitary, octandrous; corolla short, ovate, 4-cleft. Var. *alpi'num*, (winter-green whortleberry,) leaves entire, obovate · flowers sub-solitary; berries oblong, crowned with the style. 1-2 f. High mountains.

tenel''lum, (dwarf whortleberry, r-w. M ♄.) racemes bracted, sessile; corolla ovate cylindric; leaves oblong-elliptic, sub-cuneiform, serrulate, nearly smooth. White hills.

obtu'sum, (♄.) evergreen, creeping; leaves elliptic, round-obtuse at each end mucronate, entire, glabrous, coriaceous small; peduncles axillary, solitary, 1-flowered.

ova'tum, (M. ♄.) evergreen; leaves ovate, acute, revolute, serrate, smooth, coriaceous, petioled; racemes axillary and terminal, bracted, short; corolla cylindric; calyx acute.

ni'tidum, (r. M. ♄.) erect; branches distichous; leaves nitid, oval-obovate, acute at each end, glabrous, serrate; racemes terminal, corymbed, bracted, nodding; corolla cylindric, leaves perennial. *S.*

myrtifo'lium, (♄.) creeping, very glabrous; leaves petioled, oval, lucid, revolute, denticulate; clusters axillary, nearly sessile; corolla campanulate with 5 short teeth; anthers unawned at the back. Berries small, pedicelled, black · leaves perennial. *S.*

arbo'reum, (farkleberry, w. M. ♄.) leaves broad-lanceolate, oval, serrulate, mucronate, shining above; pubescent beneath; racemes leafy; corolla campanulate; anthers awned.

crassifo'lium, (r. J. ♄.) diffuse; branches ascending; leaves oblong-lanceolate, acute at each end, serrate, rigid, glabrous; racemes terminal, corymbed, bracted, few flowered; flowers nodding; calyx appressed; corolla campanulate, deeply 5-parted Leaves evergreen.

myrsini'tis, (p. m. ♄.) erect, branching leaves small, sessile, ovate, mucronate, serrulate, lucid above, glandular puncture beneath; racemes short, bracted, axillary, and terminal; corolla urceolate. Berries black; leaves perennial. Var. *lanceola'tum*, leaves lanceolate, acute at each end. Var. *obtu'sum*, leaves roundish, obovate. *S.*

gale'zans, (r-w. M. ♄.) leaves sessile, cuneate-lanceolate, serrulate, pubescent; fascicles sessile; corolla urceolate; stamens included, awnless; style exserted. *S.*

VALERIA'NA. 3—1. (*Dipsaceæ.*) [From *Valerias*, who first described it.]

dio'ica, (r. J. ♃.) glabrous, radical leaves sub-spatulate, ovate, entire, very long, petioled; cauline ones few, pinnatifid; divisions lanceolate, entire.

phu, cauline leaves pinnate, radical ones undivided; stem smooth. The Valerian of medicine. Ex.

VALERIANEL''LA. 3—1. (*Dipsaceæ.*) [A diminutive of Valeriana; from which this genus was separated.]

rhombicar''pa, (b-w. J. ☉.) stem dichotomous above, ciliate-angled; radical leaves obovate; cauline ones spatulate oblong ciliate; upper leaves toothed at the base involucrum ciliate, scarious at the apex fruit compressed, rhomboidal. 4-6 i. Meadows. Md.

VALLISNE'RIA. 20—2. (*Hydrocharides.*) [From Anthony Vallisneri.]

spira'lis, (tape-grass, w. Au. ♃.) leaves floating, linear, obtuse, serrulate at the summit, tapering at the base, radical; peduncle of the pistillate flower long, of staminate short, erect. Grows in still water.

VERA'TRUM. 6—3. (*Junci.*)

vir''ide, (Indian poke, white hellebore, g. J. y. ♃.) racemes paniculate; bracts of the branches oblong-lanceolate, partial ones longer than the sub-pubescent peduncles; leaves broad-ovate, plaited. 3-5 f. Meadows and swamps. Abundant in the valleys of the Green Mountains.

angustifo'lium, (g-y. J. ♃.) flowers diœcious; panicle simple, petals linear; leaves very long, linear-keeled. Mountains.

parviflo'rum, (g. Ju.) leaves oval, lanceolate, flat, glabrous; panicle slender, spreading; petals acute at each end, staminiferous. *S.*

VERBAS''CUM. 5—1. (*Solaneæ.*) [From ***barbascum***, on account of its being bearded.]

thap''sus, (mullein, y. J. ♂.) leaves decurrent, downy both sides; stem generally simple, though sometimes branched above; flowers in a cylindric spike. 3-6 f.

blatta'ria, (moth mullein, sleek mullein, w-y. J. ♃.) leaves glabrous, tooth serrate; lower ones oblong-obovate; upper ones heart-ovate, clasping: pedicels 1-flowered, in a terminal, panicled raceme. Var. *al''ba*, leaves toothed; flowers white. Var. *lu'tea*, leaves doubly serrate; flowers yellow. 2-3 f.

lychni'tis, (y. J. ♂.) stem angular; leaves oblong, cuneate, white-downy beneath; spikes lax, lateral and terminal.

phœ'nicum, (♃.) a very handsome species.

VERBE'NA. 13—1. (*Labiatæ.*) From *herbe'na*, a name of distinction for herbs used in sacred rites. The vervain in former times was held sacred, and employed in celebrating sacrificial rites.]

hasta'ta, (vervain, simpler's joy, p-w. Ju. ♃.) erect, tall, leaves lanceolate, acuminate, gash-serrate; lower ones sometimes gash-hastate; spikes linear, panicled, sub-imbricate. Var. *pinnatifi'da*, has the leaves gash-pinnatifid, coarsely toothed. Var. *oblongifo'lia*, leaves lance-oblong, deeply serrate, acute; spikes filiform, panicled. 2-5 f.

urticifo'lia, (nettle-leaf vervain, w. Ju. ♃.) erect, sub-pubescent; leaves oval, acute, serrate, petioled; spikes filiform, loose, axillary, terminal; flowers tetrandrous. 2-3 f.

spu'ria, (b. Au. ☉.) stem decumbent, branched, divaricate; leaves laciniate, much divided; spikes filiform; bracts exceeding the calyx. 1-2 f. Sandy fields.

angustifo'lia, (b. J. ♃.) erect, mostly simple; leaves lance-linear, attenuate at the base, remotely toothed, with elevated veins; spikes filiform, solitary, axillary and terminal.

stric''ta, (b. Ju. ♃.) stems rigidly erect; leaves sessile, obovate serrate, sub tomentose, very hirsute; spikes straight, imbricate, fascicled. Var. *mol''lis*, (p.) stem simple, terete, villose; leaves ovate, acutish unequally gash-toothed; teeth acute, hirsute above, soft villose beneath; spikes dense-flowered, terminal, somewhat in threes. Perhaps a distinct species. *S.*

panicula'ta, (p. Ju. ♃.) scabrous; leaves lanceolate, coarsely serrate, undivided; spikes filiform, imbricate, corymb-panicled. 4-6 f. *S.*

bipin''natifi'da, (b. J. ♃.) hirsute; leaves 3-cleft, bipinnatifid; divisions linear; nuts deeply punctate. *S.*

carolin''ia'na, (p. J. ♃.) scabrous; leaves oblong-obovate, obtuse, unequally serrate, tapering at base, sub-sessile; spikes very long, filiform; flowers distinct. 2 f. *S.*

melin''dres, (common scarlet verbena,) stem prostrate. Introduced from S. America.

tweedia'na, stem erect; flowers crimson

sabin''ii, stem prostrate; flowers lilac one variety has white flowers. Ex.

sulphu'rea, stem prostrate; flowers yellow. Ex.

VERBESI'NA. 17—2. (*Corymbiferæ.*)

siegesbeck''ia, (y. Au. ♃.) stem winged, leaves opposite, ovate-lanceolate, acuminate at each end, acutely serrate; corymbs brachiate; branches irregularly many-flowered at the summit; root creeping; stem erect, 4-6 f., 4-winged; ray-florets 3-toothed. Shady woods. Penn. to Car. Crown beard.

virgin''ica, (w. Ju. ♃.) stem narrow winged; leaves alternate, broad, lanceolate, sub-serrate; corymb compound; involucrum oblong, pubescent, imbricate; ray-florets 3 or 4; seeds four-angled. 3-6 f.

sinua'ta, (w. Oc. ♃.) stem pubescent, striate; leaves alternate, sessile, sinuate, attenuate at base; flowers corymbed; involucrum imbricate; ray-florets 3-5. 4-6 f *S.*

VERNO'NIA. 17—1. (*Corymbiferæ.*)

noveboracen'sis, (flat-top, p. Au. ♃.) leaves numerous, lanceolate, scabrous, serrulate; corymbs fastigiate; scales of the involucre filiform at the summit; flowers in a large terminal corymb; stem 4-6 f. Branching towards the top. Wet grounds. Can. to Car.

tomento'sa, (p. Au. ♃.) stem tomentose above; leaves long, narrow, lanceolate, acutely serrate, slightly scabrous above hoary tomentose beneath; corymb fastigiate; scales of the involucrum filiform at the apex. 3-5 f.

angustifo'lia, (p. Ju. ♃.) stem simple, somewhat scabrous; leaves numerous, long linear, nearly entire; corymb sub-umbelled, scales of the involucrum rigid, mucronate 3 f. *S.*

altis''sima, (p. Au. ♃.) stem glabrous leaves lanceolate, serrate, somewhat scabrous; involucrum small, hemispheric; scales ovate, acute, ciliate, unawned, closely appressed. Var. *margina'ta*, (p.) leaves narrow-lanceolate, glabrous, very entire corymb fastigiate; involucrum hemispheric

turbinate scales arachnoid-ciliate, a little mucronate. Perhaps a distinct species. *S.*

scaberri'ma, (p. Ju. ♃.) stem simple: leaves lance-linear, denticulate, scabrous, hairy; corymb sub-umbelled; scales of the involucrum lanceolate, mucronate. 2 f. *S.*

fascicula'ta, (Au. ♃.) leaves long, linear, sparingly serrate; flowers corymbed, approximate; involucrum ovoid, smooth; scales unarmed. *S.*

VERON"ICA. 2—1. (*Pediculares.*)

officina'lis, (speedwell, b. M. ♃.) spikes lateral, peduncled; leaves opposite, obovate, hairy; stem procumbent, rough-haired. 9-12 i.

anagal"liss, (brook pimpernel, b. J. ♃.) racemes opposite, long, loose; leaves lanceolate, serrate; stem erect. 12-18 i.

beccabun"ga, (brook-lime, b. J. ♃.) racemes opposite; leaves oval-obtuse, sub-serrate, glabrous; stem procumbent, rooting at the base. Probably a variety of the last. 9-18 i.

serpyllifo'lia, (b. M. to Au. ♃.) racemes spiked, many-flowered; leaves ovate, slightly crenate; capsules broad obcordate; stems procumbent, 3-5 inches long, sometimes creeping; flowers pale, in a long terminal spike, or raceme. Meadows. Introduced.

scutella'ta, racemes axillary, alternate; pedicels divaricate; leaves linear, dentate-serrate; stem erect, weak. 6-12 i. Flowers flesh-colored, racemed. Moist places.

agres"tis, flower peduncled; leaves on short petioles, cordate ovate, deeply serrate; segments of the calyx ovate-lanceolate; stem procumbent; flowers small, pale blue, axillary, solitary. Sandy fields. Can. to Car.

alpi'na, leaves opposite, lance-oblong, acute, toothed; corymb terminal; calyx hispid.

arven"sis, (field veronica. w-b. M. ⊙.) stem procumbent; flowers solitary; lower leaves opposite, petioled, cordate-ovate, serrate; floral leaves alternate, lanceolate, sessile, longer than the peduncles; segments of the calyx unequal. Var. *renifor"mis,* leaves reniform, entire, sessile. 3 8 i.

hederifo'lia, (ivy speedwell, w-b. M. ⊙.) flowers solitary; leaves as long as the petioles, round-cordate, 5-lobed; upper ones 3-lobed; segments of the calyx cordate, ciliate, acute; stem procumbent.

peregri'na, (Maryland veronica, w. Mar. ⊙.) flowers solitary, sessile; leaves oblong, obtuse, toothed and entire; lower ones opposite, upper ones alternate, linear-lanceolate. 4 8 i.

renifor"mis, (b. J. ♃.) stem creeping; spikes peduncled; peduncles lateral, axillary, 1-bracted; leaves opposite, long-petioled, heart-reniform, gash-crenate. *S*

VESICA'RIA. 14—1. (*Cruciferæ.*,

didymocar"pa, white-downy, down stellated, calyx equal silicles large, inflated, in pairs; radical leaves broad ovate-spatulate; the rest lanceolate sub-entire. Rocky Mountains, and West.

VEXILLA'RIA. 16—10. (*Leguminosæ.*) From *vexillum,* a banner.]

virgin"ia'na, (butterfly weed, p. Ju. ♃.) stem twining, and with the ovate leafets glabrous or sub-pubescent; peduncle 1-4-flowered; calyx 5-parted, about as long as the lanceolate-bracts; legume linear, compressed; flowers larger than those of any other North American papilionaceous plant. Hedges. Penn. to Car.

maria'na, stem climbing, glabrous; leaves ternate; leafets lance-oval; peduncles solitary, 1-3-flowered; calyx tubular-campanulate, glabrous, much longer than the bracts, legume torulose. Banks of streams. Flowers large, pale blue.

plumi'era, climbing; leaves ternate, ovate-oblong, acuminate; calyx campanulate, shorter than the ovate bracts; corolla large, silky. *S.*

VIBUR"NUM. 5—3. (*Caprifoliæ.*)

oxycoc"cus, (high cranberry, r-w. J. ♄.) leaves 3-lobed, acute at the base, 3-nerved; lobes divaricate, acuminate, remotely and obtusely toothed; petioles glandular; cymes radiate; flowers of the ray large, abortive. Small shrub with spreading branches; fruit large, red, acid. 5-8 f. Mountain woods.

lantanoi'des, (hobble-bush, w. M. ♄.) branches flexuose, often procumbent; leaves orbicular-ovate, abruptly acuminate, unequally serrate; nerves and petioles pulverulent-tomentose; cymes closely sessile; fruit ovate. 4-8 f. Fruit red, black when fully ripe. Mountains.

pyrifo'lium, (w. J. ♄.) smooth; leaves ovate-oblong, acute, crenate, serrate; petiole naked; cymes sub-pedunculate; fruit oblong-ovate. 5-10 f.

lenta'go, (sheep-berry, w. J. ♄.) glabrous; leaves broad-ovate, acuminate, hook-serrate; petioles margined, undulate; cymes sessile. The branches, when full grown, often form a fastigiate top. Berries black, oval, and pleasant tasted; somewhat mucilaginous. 8-15 f.

acerifo'lium, (maple guelder-rose, dockmackie, w, J. ♄.) leaves heart-ovate, or 3-lobed, acuminate, sharp serrate, pubescent beneath; cymes long peduncled; stem very flexible; leaves broad and sub membranaceous. 4 5 f. Leaves applied to inflamed tumors by the Indians.

nu'dum, w. M. ♄.) glabrous; leaves oval, sub-entire; margins revolute; petioles naked; cymes peduncled; flowers small, crowded. Berries black. 8-12 f.

pubes"cens, (w. J. ♄.) pubescent; leaves short-petioled, ovate, acuminate, dentate-serrate, villose beneath; cymes peduncled fruit oblong. 6 f. High grounds.

cassinoi'des, (J. ♄.) glabrous; leaves lanceolate, acute at each end, crenate; margins slightly revolute; petioles keeled, without glands. Swamps.

denta'tum, (arrow-wood, w. M. ♄.) smoothish; leaves long petioled, orbicular-ovate, dentate-serrate, plicate, glabrous both sides; cyme peduncled; fruit sub-globose. Fruit blue. 8 f.

obova'tum, (M. ♄.) glabrous; branches virgate; leaves obovate, crenate, dentate or entire, obtuse; cymes sessile, fruit ovate, roundish. Var. *punicifolium*, leaves obovate, entire or slightly crenate at the apex, obtuse. 4-8 f. *S.*

ni'tidum, (♄.) very glabrous; leaves lance-linear, shining above, obscurely serrate or entire, small; branches quadrangular. *S.*

mol''le, (J. ♃.) leaves roundish-cordate, plicate, toothed, pubescent beneath; petioles sub-glandular; cymes with rays. Berries red. *S.*

læviga'tum, (w. J. ♄.) stem much branched; leaves lanceolate, smooth, remotely serrate, entire at base; branchlets 2-edged. *S*

Exotic.

op''ulus, (guelder-rose, snow-ball, w. J. ♄.) leaves 3-lobed, sharp-toothed; petioles glandular, smooth; flowers in compact cymes, surrounded with radiating florets. Var. *ro'seum*, has the whole cyme made up of radiating florets.

ti'nus, (laurestine, r-w. ♄.) leaves ovate, entire, with tufts of hair in the axils of the veins beneath; flowers in smooth cymes.

VI'CIA. 16—10. (*Leguminosæ.*) [From *vincio*, to bind together, as the tendrils of this plant twine around other plants.]

caroli'nia'na, (M. ♃.) smoothish; leafets 8-10; stipules lance-oval, entire; peduncles many-flowered; flowers distant; teeth of the calyx short; style villose at the top; legume smooth, obliquely veined; stem long and climbing; flowers small, white, the standard tipped with black. Mountains. Penn. to Car.

sati'va, (common vetch-tare, b. J. ⊙.) leafets 10-12; stipules with a dark spot beneath; style bearded at top; flowers small. 1-2 f.

crac''ca, (tufted vetch, p. Au. ♃.) stem sub-pubescent; leaves pinnate; flowers small, pale, numerous, drooping, imbricated. Meadows. New E.

america'na, (p. J. ♃.) peduncles many-flowered, shorter than the leaves; stipules semi-sagittate, dentate; leafets numerous, elliptical-lanceolate, smooth, obtuse, mucronate. Shady woods. Niagara. Genesee Falls.

acutifo'lia, (w. Ap.) peduncles few-flowered; stipules lanceolate, entire; leafets (6) linear, acute at each end; stem glabrous, somewhat angled; legume glabrous, many-seeded. 2-3 f. *S.*

fa'ba, (garden-bean, windsor-bean, w. and black, J. ⊙.) stem many-flowered, erect, strong, legumes ascending, tumid, coriaceous; leafets oval-acute, entire; stipules sagittate, toothed at the base. From Persia.

VILLAR''SIA. 5—1. (*Gentianæ.*)

lacuno'sa, (w. Au. ♃.) leaves reniform, sub-peltate, slightly crenate, lacunose beneath; petioles long, bearing the flowers; corolla smooth; stem long, filiform, floating; flowers somewhat umbelled. Ponds and Lakes.

corda'ta, (Ju. ♃.) leaves cordate, variegated; petioles glabrous, bearing the flowers; corolla campanulate. Shallow streams. *S.*

VIN''CA. 5—1. (*Apocyneæ.*) [From *vincio*, to bind, on account of its usefulness in making bands, or its creeping stem.]

mi'nor, (periwinkle, b. Ap. ♄.) stem procumbent; leaves lance-oval, smooth at the edges; flowers peduncled; teeth of the calyx lanceolate. Ex.

VI'OLA. 5—1. (*Cisti*, or, according to the divisions of Lindley, *Violaceæ.*) [From *ion*, because first described in Ionia.]

A. *Stemless, or with a subterranean stem.* [*Leaves more or less reniform, always cordate, younger cucullate; proper color of the corolla violet.*]

cuculla'ta, (b. p. M. ♃.) glabrous; leaves cordate, somewhat acuminate, crenate-dentate; autumnal ones largest, very exactly reniform; peduncle somewhat 4-sided, longer than the leaves; divisions of the calyx subulate, acuminate, emarginate behind, or very entire; petals (as in many American species) oblique, veiny, very entire white at the base, upper one generally naked, glabrous, lateral ones bearded, and with the upper one marked with a few blue lines. Var. *papiliona'cea*, petioles and peduncles longer; leaves sub-lance-ovate; beards of the lateral petals often yellow. Var. *tetrago'na*, peduncle strong, exactly 4-sided; petals azure color, veinless. Var. *villo'sa*, leaves, petals, and peduncles villose. 4-8 i.

palma'ta, (b-p. M. ♃.) mostly villose; leaves heart-reniform, palmate, 5-7-lobed, lobes often narrow, and gashed, middle one always larger; sometimes villose both sides, sometimes only beneath; often glabrous, all of them very often purple beneath, the first spring ones are ovate, entire; petioles sub-emarginate; peduncle somewhat 4-sided, longer than the leaves; divisions of the calyx lance-ovate, ciliate, very entire behind; petals all very entire, veiny, and white at the base; upper ones narrow, smaller, sometimes villose at the base, yet often naked, glabrous; lateral ones densely bearded, and with the upper one marked with a few blue lines. One variety has white flowers. 3-6 i.

soro'ria, (b-p. M. ♃.) leaves orbicular or roundish-cordate; the sinus often closed, crenate-serrate, mostly pilose, thickish, purple beneath, flat, appressed to the ground; petioles short, somewhat margined; stipules small, lanceolate; segments of the calyx short, glabrous, entire behind; petals obovate, entire; lateral ones densely bearded; stigma depressed, with a deflexed beak; capsule smooth.

[*Leaves oblong or ovate, never reniform, younger ones cucullate.*]

sagitta'ta, (E. b-p. Ap. ♃.) glabrous leaves ciliate, oblong, not acute, sagittate-cordate, dentate, gashed at the base (or furnished with elongated divaricate teeth); peduncle somewhat 4-sided, longer than the leaves; divisions of the calyx lanceolate, acuminate, emarginate behind; petals all very entire, veiny, white at the base upper one generally naked, glabrous; lateral ones densely bearded, and with the upper one marked with a few blue lines; spur elongated behind. A variety has the leaves more or less villose. Dry.

[*Leaves ovate or lanceolate; corolla white, with the lateral petals narrower.*]

amœ'na, (E. w. Ap. ♃.) glabrous; leaves ovate, sub-acuminate, crenate, sometimes sub-villose above; petioles long, spotted with red; peduncle somewhat 4-sided, equalling or exceeding the length of the leaves, spotted; divisions of the calyx lanceolate; petals all very entire, green at the base; lateral ones sometimes with the base pubescent, and with the upper one marked with a few blue lines. Moist woods. Flowers odorous.

primulifo'lia, (primrose-leaved violet, w. J. ♃.) stoloniferous; leaves oblong, subcordate, abruptly decurrent into the petiole; nerves beneath and scape somewhat pubescent; sepals lanceolate; petals obtuse; the two lateral ones a little bearded and striate; stigma capitate, rostrate. Var. *villo'sa*, leaves very green; petioles densely villose, becoming hoary. Flowers odorous.

blan''da, (smooth violet, w. Ap. ♃.) glabrous; leaves round, sometimes sub-ovate, crenate, appressed to the ground; sometimes sprinkled with a few short hairs above; petioles pubescent; peduncles somewhat 4-sided, longer than the leaves; segments of the calyx lanceolate, obtuse; petals all very entire, green at the base; lateral ones slightly bearded and striate, the lower one distinctly striate and somewhat bearded; stigma depressed, rostrate; corolla small, odorous. 2-4 i. Wet, low grounds.

[*Stemless, not belonging to the preceding divisions.*]

rotundifo'lia, (O. M. y. ♃.) glabrous; leaves thickish, appressed to the earth, broad-ovate or orbicular, cordate, crenate; nerves pubescent beneath; sinus closed; peduncle somewhat 4-sided, as long as the leaves; divisions of the calyx oblong, obtuse; petals sometimes emarginate, upper ones small; lateral ones somewhat bearded, and with the upper one marked with a few yellowish brown lines; spur very short. Woods. 1-3 i.

peda'ta, (M. p-b. ♃.) glabrous; leaves sometimes ciliate, variously divided, very open, pedately 9-parted; divisions linear, and obtusely lanceolate, generally 3-lobed at the apex, often simply lanceolate, with the apex 5-7-lobed; peduncle somewhat 4-sided; divisions of the calyx lanceolate, acute, ciliate, emarginate behind; petals all white at the base, veinless, very entire, very glabrous, naked; upper one truncate, and marked with a few very blue lines, sometimes obsolete. Var. *veluti'na*, has the two lower petals of a very deep violet-color, and appears like velvet. Var *al'ba*, has white flowers. Dry 3-4 i. *S*

B. *Caulescent.*

pubes''cens, (y. ♃.) villose-pubescent, stem simple, erect, terete, leafless below leaves broad-ovate, cordate, dentate; petioles short; stipules large, ovate, dentate, peduncles 4-sided, shorter than the leaves; bracts subulate; minute divisions of the calyx lanceolate; petals all very entire, veinless; upper one naked, glabrous; lateral ones bearded, and with the upper one marked with a few blue lines; lower ones often becoming reddish outside; spur short, gibbous, acutish; stigma pubescent, scarcely beaked. Varies in pubescence, leaves are sometimes glabrous; the capsules are either glabrous or woolly. 4-12 i., rarely 4 f.

rostra'ta, (beaked violet, b-p. M. ♃.) smooth; stem diffuse, erect, terete; leaves orbicular and ovate, cordate, crenate-dentate, younger ones cucullate; stipules linear, acuminate, furnished with elongated, linear teeth; peduncles filiform, axillary, very long; segments of the calyx lanceolate, acute, entire behind; petals all very entire, veinless, naked, beardless, upper and lateral ones marked with a few blue lines; spur straight, linear, compressed, obtuse, double the length of the petals; stigma sub-clavate; root woody, perpendicular, fibrous. Var. *barba'ta*, lateral petals bearded. 6-10 i.

stria'ta, (striped violet, y-w. J. ♃.) smooth; stem oblique, branching, angular; leaves roundish, ovate, sub-acuminate, crenate-dentate, sometimes sub-pubescent; petioles long; stipules large, oblong-lanceolate, dentate-ciliate; peduncles quadrangular; bracts linear, rather large; segments of the calyx lanceolate, acuminate, ciliate, emarginate behind; petals entire, upper one marked with a few blue lines, naked, smooth, sometimes a little villose, lateral ones bearded, lower one occasionally a little villose; spur sub-porrected; stigma pubescent behind.

muh'lenberg''ia'na, (slender violet, b-p M. ♃.) smooth; stem weak, sub-prostrate; leaves reniform-cordate, upper ones ovate, crenate; stipules lanceolate, serrate-ciliate, sub-pinnate; peduncles somewhat quadrangular, axillary, longer than the leaves, bracts minute, subulate; segments of the calyx linear, acute, sub-ciliate; petals all entire, veinless; upper one naked, glabrous, lateral ones bearded, the upper one marked with a few blue lines; spur porrected, compressed, obtuse; stigma ciliate behind; beak ascending. 3-6 i.

hasta'ta, (halbert-violet, y. M. ♃.) smooth· stem erect, simple, terete, leafy above; leaves long-petioled, cordate-lanceolate or hastate, acuminate; lobes obtuse, dentate; stipules minute, ciliate-dentate; petals all very entire, lower ones dilated, sub-3-lobed, lateral ones slightly bearded; spur short, gibbose, acutish; stigma truncate, or pubescent; capsule glabrous, or pubescent on all sides. Var. *gib'ba*, has no hastate or deltoid leaves. 8-12 i. Mountains.

canaden''sis, (r. w-y. M. ♃.) smooth stem sub-simple, erect, terete; stipules en tire, membranaceous, oblong, sub-ovate or lance-ovate; leaves broad-cordate, acuminate, serrate, slightly pubescent on the nerves, lower ones long-petioled; peduncle somewhat 4-sided; bracts subulate; flowers regular, large; segments of the calyx subulate, acute, entire behind; petals white, very entire, veiny, becoming yellow at the base, lower ones pale violet, upper ones broad, spreading, lateral ones bearded, with the upper one marked with a few blue lines; stigma short, pubescent; spur very short; flowers odorous. 6-24 i. Moist. Rocky woods.

C. *Exotic.*

tri'color, (garden-violet, heart's-ease, pansy, p. y. b-p. M. ♃.) stem angular, diffuse, divided; leaves oblong, deeply crenate; stipules lyrate-pinnatifid.

odora'ta, (sweet-violet, b. M. ♄.) stemless; scions creeping; leaves cordate, crenate, smoothish; calyx obtuse; two lateral petals with a bearded or hairy line.

VIRGIL″IA. 10—1. (*Leguminosæ.*) [In honor of the poet Virgil.]

lute'a, (y. J. ♄.) leaves pinnate; leafets alternate, ovate, short, acuminate, glabrous; racemes elongated, pendulous; legumes petioled, flat. The bark is used in dying yellow. *S.*

VIS″CUM. 20—4. (*Caprifoliæ.*) [From the Greek *ixos*, altered by the Æolians into *biskos*. The Greeks had a great veneration for this plant on account of its supposed medical virtues, and the Druids ascribed to it many miraculous powers.]

ru'brum, (♄.) leaves lance-obovate, obtuse; spikes axillary, whorled. *S.*

purpu'reum, (♄.) leaves obovate, obtuse, obsoletely 3-nerved; spikes axillary; flowers opposite. *S.*

verticilla'tum, (mistletoe, g. w. J. ♃.) branches opposite and whorled; leaves wedge-obovate, 3 nerved; spikes axillary, a little shorter than the leaves; berries yellowish white. On the branches of old trees.

VI'TIS. 5—1. (*Vitices.*)

labrus″ca, (plum-grape, w-g. J. ♄.) leaves broad-cordate, lobe angled, white-downy beneath; fertile racemes small; berries (blue, flesh-color, and green) large. Var. *labruscoi'des*, (fox-grape), has smaller fruit, approaching a tart taste.

vulpi'na, (frost-grape, g-w. J. ♄.) leaves cordate, acuminate, gash-toothed, glabrous both sides; racemes lax, many-flowered; berries small; leaves very variable, but the uppermost mature leaves will agree with the description.

æsti'valis, (summer-grape, J. ♄.) leaves 3-5 lobed, younger ones rust-downy beneath, when old nearly smooth; sinuses rounded; racemes opposite the leaves, crowded, oblong; berries deep-blue or purple. Woods, on banks of streams.

ripa'ria, (w-g. M. ♄.) leaves unequally incisely toothed, shortly 3-lobed, pubescent on the petioles, margins, and nerves; flowers sweet-scented.

bipinna'ta, (g-w. Ju.) leaves bipinnate, glabrous; leafets incisely serrate; flowers pentandrous; berry 2-celled; cells 1-2 seeded. *S.*

indi'visa, (J. ♃.) leaves simple, cordate or truncate at base, somewhat 3-nerved, pubescent on the nerves beneath; flowers pentandrous and pentapetalous; berry 1-celled, 1-2 seeded. Swamps.

vinif'era, (wine-grape, J. ♄.) leaves sinuate-lobed, naked or downy. Ex.

WARE'A. 14—2. (*Cruciferæ.*)

cuneifo'lia, (w.) leaves nearly sessile, rather thick, oblong, obtuse, attenuate at the base; siliques with the valves somewhat convex. 1-2 f. Georgia and Florida.

amplexifo'lia, (p. ☉.) silique two-edged, pendulous; leaves oblong-ovate, half-clasping. 1 f. *S.*

XAN″THIUM. 19—5. (*Corymbiferæ.*) [From *xanthos*, yellow, a color said to be produced by the plant.]

struma'rium, (cockle-burr, sea-burdock, Au. ☉.) stem unarmed; leaves ovate, angulate-dentate, sub-cordate, and strongly 3-nerved at base; fruit oval, pubescent, armed with rigid, hooked bristles. 3-6 f.

spino'sum, (thorny clot-weed, S. ☉.), spines ternate; leaves 3-lobed; flowers axillary, solitary. 2-4 f.

XANTHOX″YLUM. 20—5. (*Terebintaceæ.*) [From *xanthos*, yellow, and *xulon*, wood, alluding to its color.]

fraxin″eum, (prickly ash, tooth-ache bush, g-w. M. ♄.) prickly; leaves pinnate; leafets lance-oval, sub-entire, equal at base; petioles terete, unarmed; umbels axillary. 8-12 f. The bark is pungent, and is used for medicinal purposes.

tricar″pum, (J. ♄.) leaves glabrous, pinnate; leafets petioled, falcate-lanceolate crenate-serrate; petioles unarmed; flowers bearing petals; capsules mostly in threes leaves very aromatic and pungent.

XANTHORHI'ZA. 5—12. (*Ranunculaceæ.*) [From *xanthos*, yellow, and *riza*, root.]

apiifo'lia (parsley yellow-root, Ap. ♄.) leaves 3-ternate; petioles dilated and clasping at the base; flowers racemed. 1-3 f Banks of streams.

XEROPHYL″LUM. 6—3. (*Junci.*)

asphodeloi'des, (w. J. ♃.) filaments dilated toward the base, and equalling the corolla; racemes oblong, crowded; bracts setaceous; scape leafy; leaves subulate, 3-5 f.

te'nax, (w. J. ♃.) scape leafy; racemes lax; bracts membranaceous; petals elliptic; filaments filiform, exceeding the corolla, leaves subulate-setaceous, very long. *S.*

XYLOS″TEUM. 5—1. (*Caprifoliæ.*)

cilia'tum, (fly-honeysuckle, twin-berry, w-y. M. ♄.) berries distinct; leaves ovate and sub-cordate, margin ciliate, in the young state villose beneath; corolla a little calcarate at the base, tube ventricose above, divisions short, acute; style exsert. 3-4 f.

solo'nis, (swamp twin-berry, y. M. ♄.) berries united in one, bi-umbilicate (never distinct), two flowers situated on one germ leaves oblong-ovate, villose. Berries dark purple. 2 f.

XY'RIS. 3—1. (*Junci.*) [From a Greek word, signifying pointed.]

carolin''ia'na, (yellow-eyed grass, E. y. Au. ♃.) leaves linear, grass-like; stem or scape two-edged; head ovate, acute; scales obtuse. 9-18 i.

brevifo'lia, (y. Au. ♃.) leaves subulate-ensiform, short; interior valves of the calyx shorter than the exterior, somewhat gash-toothed. 12 i.

jun''cea, (M. ♃.) leaves terete, hollow, acute; scape terete, sheathed at the base; calyx about as long as the roundish bracts; head oval. 6-12 i. *S.*

in''dica, (y. J. ♃.) leaves long, grass-like, tortuous; scape tortuous; heads globose; scales nearly round, obtuse. *S.*

fimbria'ta, (feathered xyris, J. ♃.) heads lax-imbricate; calyx much longer than the bracts, fimbriate; leaves long, sword-shaped. 2 f. *S.*

YUC''CA. 6—1. (*Liliaceæ.*) [From *Juca,* the Indian name. *S.*]

filamento'sa, (silk-grass, w. Au. ♃.) stemless; leaves lanceolate, broad, entire, filamentose on the margin; stigmas recurved, spreading. 2-5 f.

glorio'sa, (w. Au. ♃.) caulescent, branching; leaves broad-lanceolate, plaited, entire; petals lanceolate. 2-4 f.

alnifo'lia, leaves lance-linear, with callous crenatures, rigid. 10-12 f.

ZA'MIA. 20—12. (*Coniferæ.*) [From *zemia,* damage or loss, in allusion to the fact that the staminate aments produce no seed.]

integrifo'lia, (♄.) frond pinnate; leafets lanceolate, roundish-obtuse, attenuate at base, minutely serrate toward the apex, stipe glabrous, somewhat 4-cornered. *S.*

spira'lis, flowers diœcious; leaves rigid, coriaceous, erect; nut oblong, erect, scaly, very hard. A native of New South Wales.

ZANNICHEL''LIA. 19—1. (*Naides.*)

palus''tris, anthers 4-celled; stigmas entire; pericarps toothed on the back; stem long, filiform; flowers small, axillary. Horn pond-weed. Ditches.

interme'dia, (false pond-weed, Ju. ☉.) anther 2-celled; stigmas dentate-crenate; seed smooth, entire on the back; stem filiform; leaves entire. Salt-marsh ditches.

ZAPA'NIA. 13—2. (*Scrophulariæ.*)

nodiflo'ra, (b-w. Ju. ♃.) leaves ovate wedge-form, serrate above; spikes solitary, in long filiform peduncles, forming conical heads; stem herbaceous, creeping, 6-8 inches long, procumbent.

lanceola'ta, leaves linear-lanceolate; spikes solitary. Banks of streams.

ZE'A. 19—3. (*Gramineæ.*) [An ancient Greek name.]

mays, (Indian-corn, y-g. Ju. ☉.) leaves lance-linear, entire, keeled. *S.*

ZIGADE'NUS. 6—3. (*Junci.*)

glaberri'mus, (w. J. ♃.) scape leafy, bracts ovate, acuminate; petals acuminate, leaves long, recurved, channelled. 2-4 f.

el''egans, (w. J. ♃.) scape nearly naked; bracts linear; petals ovate, acute. *S.*

ZIN''NIA. 17—2. (*Corymbiferæ.*)

viola'cea, (r-p. Ju.) leaves ovate-acute, sessile, sub-crenate; chaff imbricate-serrate.

el''egans, (p. J. ☉.) heads stalked; leaves amplexicaul, cordate, ovate, sessile, opposite; stem hairy; scales serrate. 2 f. Mexico.

multiflo'ra, (r. S. ☉.) flowers peduncled, leaves opposite, sub-petioled, lance-ovate. *S.*

ZIZA'NIA. 19—6. (*Gramineæ.*)

aquat''ica, (wild rice, Au. ♃.) panicle pyramidal, divaricate and sterile at the base, spiked and fertile above; pedicels clavate; awns long; seed linear. In water.

milia'cea, (Au. ♃.) panicle effuse, pyramidal; glumes short-awned; staminate and pistillate flowers intermingled; style 1, seed ovate, smooth; leaves glaucous. 6-10 f. In water.

ZI'ZIA. 5—2. (*Umbelliferæ.*)

corda'ta, (y. J. ♃.) radical leaves undivided, cordate, crenate, petiolate, cauline ones sub-sessile, ternate; segments petiolate, ovate, cordate, serrate; partial involucre 1-leaved. 12-18 i. Fruit black. Canada to Florida.

au'rea, (golden alexanders, y. J. ♃.) leaves biternate, shining; leafets lance-oval; umbels with short peduncles. 1-2 f.

integerri'ma, (y. J. ♃.) very glabrous; leaves biternate, sub-glaucous, lower ones thrice ternate, upper ones twice; leafets oblique, oval, entire; umbels with elongated peduncles. 12-18 i. Mountains.

ZI'ZIPHUS. 5—1. (*Rhamni.*)

volu'biles, (g-y. Ju. ♃.) unarmed; leaves ovate, ribbed, entire; umbels axillary, peduncled; stem twining. *S.*

ZOR''NIA. 16—10. (*Leguminosæ.*)

tetraphyl''la, (y. Ju. ♃.) leaves digitate leafets 4, lanceolate, glabrous; spikes axillary, peduncled; flowers alternate, 2-bracted; bracts roundish. *S.*

ZOS''TERA. 19—1. (*Naides.*) [From *zoster,* a girdle.]

mari'na, (sea-eel grass, Au. ♃.) leaves entire; stem terete; flowers very small leaves long. In salt water

INDEX AND VOCABULARY.

The accent being single, marks only the accented syllable, without reference to quantity, or whether the vowel be long or short.

A (Greek *privative*), in composition, signifies *privation;* as *acaulis*, without a caulis or stem.

Abax'ial or *Abax'ile.* Not following the direction of the axis.

Abnor'mal, 105.

—— buds, 48, *b*.

—— process, 106.

Abor'tive organs, 323, 2d.

Abrupt' leaf. A pinnate leaf with an odd or terminal leaflet.

Absorp'tion, 61.

ACANTHA'CEÆ, 486.

Acau'les. (From *a*, wanting, and *caulis*, a stem.) Plants without stems.

Accum'bent. The radicle applied to the cleft or edges of the cotyledons.

ACERA'CEÆ, 437.

Acer'ose, 54, *i*.

Ache'nium, 90.

Achlamyd'eous. (From *a*, without, and *chlamys*, a covering.) 66.

Acic'ular. Needle-shaped.

Acids, vegetable, 140, *a*.

A'cinus. A small berry; the fruits of the mulberry and raspberry are composed of *acini.*

Acotyled'onous. (From *a*, without, and *cotyledon*, a seed lobe.) 100, 154, 284.

Acro'genous. (From *akra*, summit, and *genao*, to produce.) Plants growing from the apex only. 284.

Ac'tea. Fig. 171.

Acu'leus. (From *acus*, a needle.) A prickle.

Acu'minate. (Taper-pointed, the point mostly curved toward one edge of the leaf, like an awl. 54, *e*.

Acute'. Ending in an acute angle.

Ad'am's cup, 230.

—— needle, Plate 2, Fig. 1.

Adanson'ia, 248, *a*.

Adel'phous. (From the Greek *adelphos*, a brother.) Stamens united by filaments.

Adhe'sion, 323, 1st.

Adnate', 79, *a*.

Æsti'vales. (From *æstas*, summer.) Plants which blossom in summer.

Æstiva'tion, 66.

—— of peduncles, 84, *a*.

A'fora. (From *a*, without, and *fores*, a door.) Having no doors or valves.

Aga'mous. (From *a*, without, and *gamos*, marriage.) A term derived from the views of some botanists respecting the sexual distinctions of plants. Plants without any visible stamens or pistils by French botanists are called *agamous.* 148.

Age. Effect on plants, 324, 6th.

A'gents which affect the growth of plants, 312.

Agglom'erated. Bunched, crowded together.

Ag'gregate. Assembled closely.

Ag'gregate flowers, 179.

Ai'grette, 162.

Air, 114, *a*.

A'la. (Latin, signifying wing.)

A'læ (plural). The two lateral petals of a papilionaceous flower.

Al'bus White

Albu'men. The farinaceous, fleshy or horny substance which constitutes the chief bulk of monocotyledonous seeds; as wheat, rye, &c., 99.

Albur'num. (From *albus*, white.) The soft white substance (sap-wood) which in trees is found between the wood and liber, or inner bark, becoming solid, in progress of time, it is converted into heart-wood. 123, 128.

AL'GÆ. Sea-weeds, 570.

Algol'ogy. Study of sea-weeds.

ALISMA'CEÆ, 536.

Al'pine. Growing naturally on high mountains.

Alter'nate. Branches, leaves, flowers, &c., are *alternate* when beginning at different distances on the stem; opposite, when base stands against base.

Alter'nately-pinnate leaf. Leaflets arranged, alternately, on each side of the common petiole.

Alve'olate. Honeycombed.

AMARANTA'CEÆ, 504.

Amaran'thus, 276.

AMARYLLIDA'CEÆ, 544.

AMENTA'CEÆ, 277.

A'ment, 68. Fig. 95, *a*.

Amer'ican botanists, 364.

Amer'ican laurel, 218.

Am'bitus. The outer rim of a frond, receptacle, &c.

Amplexicau'lis. Clasping the base of the stems.

Amyg'dalous, 226.

AMYR'IDACEÆ, 436.

ANACARDIA'CEÆ, 435.

Anal'ogy of petals with stamens, 75.

—— between animal and vegetable physiology, 114, *c*.

—— between plants and animals, 115, 383, 384

Anal'ysis of flowers, 14, 15, 16, 17, 24.

Anas'tomosis, 118.

Ancip'etal. Having two sharp edges like a sword.

An'dria. Stamen.

Andrœ'cium. The staminate system.

Androg'ynous plants. Having both stamens and pistils.

Angiocar'pus. Fungi bearing seeds internally, 89, *a*.

Angiosper'mous. (From *angio*, a vessel, and *sperma*, a seed.) Plants whose seeds are inclosed or covered.

Angiosper'mia, 236, 238.

An'gular. Forming angles; when the stems, calyxes, capsules, &c., have ridges running lengthwise.

Angustifo'lius. Narrow-leaved.

ANNONA'CEÆ, 402.

An'nual. A plant which lives but one year. The herbage is often annual, while the root is perennial; in this case the plant is said to be perennial.

An'nual layers of wood, 133.

An'nulated. Having a ring round the capsules; as in ferns; or in mushrooms having a ringed stipe.

An'nulus. A ring.

Anom'alous. (From *a*, without, and *nomos*, law.) Irregular, or whatever forms an exception to a general rule.

Anophy'tes, 398.
An'ther. (From *anthos*, a flower; so called as indicating its importance.) 79.
——— formed from the leaf, 79.
——— magnified, Fig. 84.
Antherid'ium. A mass of pollen.
Antherif'erous. Flowers bearing anthers without filaments.
An'thesis. Opening of the flowers.
Anthotax'is, 84.
An'thophore. That part of the receptacle which supports the petals, stamens, and pistils.
Anthoxan'thum, 169.
An'thus. (Greek *anthos*, signifying a flower.) Referring to the petals only.
Antiscorbu'tics. Substances which cure eruptions.
Apet'alous. (From *a*, without, and *petalum*, a petal.) Having no petals or corollas, 71, 394.
A'pex. The top or summit.
Aphyl'lous. (From *a*, without, and *phyllon*, a leaf.) Destitute of leaves. 51, *b.*
Aphyl'læ. Without leaves.
APOCYNA'CEÆ, 497.
Apothe'cia. Fructifications of the lichens, 289.
Appear'ance of vegetable life in March, 298.
——— in April, 299.
——— in May, 300.
Ap'ple, 96.
——— tribe, 227.
Appress'ed. Closely pressed.
Ap'terous. Without wings.
Aquat'ic. (From *aqua*, water.) Growing in, or near water.
——— roots, 39.
AQUIFOLIA'CEÆ, 476.
ARA'CEÆ, 532.
Arach'noid. Resembling a spider's web.
ARALIA'CEÆ, 463.
Ar'bor. A tree.
Arbo'reous. Like a tree.
Arch'ed. Curving above, vaulted.
Ar'cuate. (From *arcus*, a bow.) Bent like a bow.
Are'ca nut, 170.
Arena'rius. Growing in sand.
Are'olate. Divided into distinct angular spaces.
Argen'teus. Silver-colored.
Ar'id. Dry.
A'ril (*arillus*). The external coat or covering of seeds which, drying, falls off spontaneously.
Aris'tate. (From *areo*, to be dried.) Awned, ending a bristle.
ARISTOLOCHIA'CEÆ, 501.
Aro'ma, 140, *c.*
Aromat'ic. Sweet-scented.
Ar'row-root, 165, Pl. 3, Fig. 6.
Ar'row-form, 54, *h.*
Artemi'sia, 262.
Artic'ulated. Jointed, as in the culm or stem of the grasses.
Artifi'cial system, 11, 157.
A'rum, 68.
Arundina'ceous. (From *arundo*, a reed.) Resembling reeds.
Arven'sis. Growing in cultivated fields.
Asa'rum, 272.
Ascend'ing. Rising from the ground obliquely.
Ascid'iate. Pitcher-form. From the Greek *askidion*, a bottle or pitcher.
ASCLEPIADA'CEÆ, 498.
Asperifo'lius. Rough-leaved.
As'phodel, 198.
Assur'gent. Rising in a curve from a declined base.
As'ter, 262.
Atten'uated. Gradually diminished or tapering.
Ater. Pitch-black.
Atmospher'ic air, 312
Auric'ulate. Having appendages resembling ears
Autum'nal flowers, 303.
AURANTIA'CEÆ, 424, 101.
Awn. A short stiff bristle. 68, *b.*
Ax'il. The angle between a leaf and stem on the upper side.
Ax'illary. Growing out of the axils.
Ax'is of plants, 107.

Bac'ca, 96.
Bac'cate, 96.
Baccif'erous. Bearing berries.
BALSAMIFLU'Æ, 526.
BALSAMINA'CEÆ, 427.
Ban'ner, 73.
Ban'yan tree, 44.
Barb. A straight process, armed with teeth pointing backward.
Barba'tus. Bearded.
Barber'ry, 199.
Bark, 125.
Bar'ren. Producing no fruit; containing stamens only.
Beak'ed. Terminating by a process shaped like the beak of a bird.
Bel'lis peren'nis, 258, *b.*
Bell-form, 72.
BERBERIDA'CEÆ, 404.
Ber'ry, 96.
BETULA'CEÆ, 524.
Bi, derived from bis, signifying two.
Bicor'nes, 217.
Bicor'nis. Anthers with two horns.
Bi'dens. Having two teeth.
Bien'nial. Living two years.
Bi'fid. Two-parted.
BIGNONIA'CEÆ, 485.
Bila'biate. Corolla with two lips.
Bi'nate. Two growing together.
Bipin'nate. Twice pinnate.
Biter'nate. Twice ternate. The petiole supporting three ternate leaves.
Bi'valve. Two-valved.
Black'berry, 228.
Blas'teme. From the Greek, *blastema*, a bud.
Bli'tum, 166.
Bole. The trunk of a tree.
BORAGINA'CEÆ, 490.
Bora'go, 184.
Botan'ical names, 163.
——— excursions, 25.
Bot'any, 10.
Bot'rus. A cluster, like grapes.
Brach'iate. Branches opposite, and each pair at right angles with the preceding.
Bract, 64, *h.* 109.
Branch. A division of the main stem or mainroot.
Branch'es, 42, 107, 108.
Branch'let. Subdivision of a branch, a twig, 42.
Bread'-fruit, 274.
BROMELIA'CEÆ, 545.
Buck'wheat, 211.
Bud, 46, 107, 108.
—— of the palm, 47.
—— undeveloped, 45.
—— with scales, 46, *c.*
Bulbs, 36.
Bulb'lets, 37, 43.
Bun'dle. See Fascicle.
BURMANNIA'CEÆ, 539.
Buto'mus, Pl. 8, Fig. 4.
Button-bush, 179.

Cab'bage of the palm, 47.
CABOMBA'CEÆ, 405.
CACTA'CEÆ, 453.
Cac'tus, 225.
Cadu'cous. (From *cado*, to fall.) Falling early.

Cæru'les-purpu reus Violet color.
Cæru'leus. Blue.
Cæsalpi'neæ, 444.
Cæsalpi'nus, 346.
Cæs'pitose. Forming tufts.
Cal'abash-tree.
Cal'amus. Reed-like.
Calca'reous. Containing lime.
Cal'carate. Resembling a spur.
Cal'la, 278.
Cal'li. Small protuberances.
CALLITRICHA'CEÆ, 517.
Cal'tha, Fig. 169.
Calyb'ion. (From *kalubion*, a little cabin.) 97.
Calycan'dria, 224, *a*.
CALYCANTHA'CEÆ, 446.
Calyc'ulated. Having an outer calyx.
Calyp'tra, 68, *a*. 286.
Ca'lyx, 12, *a*. 67.
—— superior, 67, *c*
—— inferior, 67, *c*.
Cam'bium, 119, 123.
Camel'lia, 248.
CAMPANULA'CEÆ, 474.
Campan'ulate. Bell-form.
Campes'tris. Growing in uncultivated fields.
Cam'phor, 180, *c*, 213.
Canalic'ulate. Channeled, furrowed.
Can'cellated. Appearing like lattice-work.
Canes'cent. White or hoary.
CANNA'CEÆ, 542.
Cap'illary. Hair-like.
Cap'itate. Growing in heads.
CAPPARIDA'CEÆ, 412.
CAPRIFOLIA'CEÆ, 465.
Cap'sicum, 170.
Capsula'res, 91.
Cap'sule, 91.
Car'bon, 114, *a*, 122, 312.
Carbon'ic acid, 122.
Carcer'ulares, 90.
Ca'rex, 176, 275.
Cari'cæ, 558.
Cari'na, 73.
Car'inated. Keeled, having a sharp back like the keel of a vessel.
Carmin'ative. A medicine; warming to the stomach.
Carno'se. Of a fleshy consistence.
Car'pel, 80, 111.
Car'pellary leaf, 80.
Car'pos. From the Greek *karpos*, fruit.
Car'rot, Fig. 189.
CARYOPHYLLA'CEÆ, 418.
Caryophyl'leous. Pink-like corolla, having five petals with long claws, all regular and set in a tubular calyx.
Caryop'sis, 90.
Cas'sia, 216.
Catal'pa, 169.
Cat'kin, 68.
Cat-tail, 275.
Cau'date. Appendaged; as in some seeds.
Cau'dex. The main body of a tree, or root.
Caules'cent, 41.
Cau'licle, 101.
Cau'line. Growing on the main stem.
Cau'lis. The main, herbage-bearing stem of all plants.
Cause of spring, 295.
CEDRELA'CEÆ, 426.
CELASTRA'CEÆ, 440.
Cells, 87, *b*.
Cel'lular integument, 126.
—— structure, 23.
—— tissue, 117.
—— —— of leaves, 60.
Cellula'res, 154.
Cel'lules, 117, *b*, *c*.
Ceno'bion, 94.
Ceno'bionnair, 94.
Centrif'ugal inflorescence, 82, 88, 84, *a*.
Centrip'etal inflorescence, 82, 84, *a*. 258.
CERATOPHYLLA'CEÆ, 516.
Cerea'lis. Any grain from which bread is made (From *Ceres*, goddess of corn.)
Cerion, 90.
Cer'nuous. When the top only droops.
Chaff, 173, 68, *a*.
Chaff'y. Made up of short membraneous portions like chaff.
Cha'laza, 99.
Cha'mepy'this. From the Greek *kamia*, on the ground, *pithus*, the pine-tree. This is the specific name of some plants.
Chan'neled. Hollowed out longitudinally with a rounded groove.
CHARA'CEÆ, 569.
Char'acters, factitious, 156.
—— essential, 156.
—— natural, 156.
—— positive, 159.
—— inconstant, 160.
—— coexistent, 161.
—— specific, 162.
—— generic, 162.
—— family, 162.
Characteris'tic leaf, 52.
Char'ter oak, 346, 6th.
Chem'istry, vegetable, 140.
CHENOPODIA'CEÆ, 503.
Cho'rion. A clear limpid liquor contained in a seed at the time of flowering. After the pollen is received, this liquor becomes a perfect embryo of a new plant.
Chori'sis, 71.
Chlo'rophyl, 59, 117, *a*.
Chro'mule, 87.
Chrysanthemum, 262.
Chrysobalanæ, 444.
Chrysosple'nium, 210.
Cic'atrice. The mark or natural scar from whence the leaf has fallen.
CICHORA'CEÆ, 470.
Cil'iate. Fringed with parallel hairs.
CINAROCEPH'ALÆ, 471.
Cine'reous. Ash-colored.
Cine'reus. Lead-color.
Cin'namon, 213.
Cir'cæa, 167, 168, *a*.
Cir'cinate, 51.
Cir'rhose. Bearing tendrils. From Cirrus, a tendril or climber.
Cis'sus, Fig. 135.
CISTA'CEÆ, 415.
Cit'rus, 232.
Clasp'ing. Surrounding the stem with the base of the leaf.
Class'es, 20.
Classifica'tion, Linnæus', 148.
—— Tournefort's, 147.
—— rules for, 159.
—— of fruits, 88, 89.
Cla'vate. Club-shaped, larger at the top than the bottom.
Clau'sus. Closed, shut up.
Claw. The narrow part by which a petal is inserted.
Cleft. Divided less than half way.
Climb'ing. *Ascending* by means of *tendrils*, as grapes; by leaf-stalks, as the clematis; by *cauline radicles*, or little fibrous roots, as the creeping American-ivy.
Clinan'the. The dilated summit of a peduncle, bearing flowers. The receptacle.
Clo'ver, 254.
Club-shaped. Clavate.
Clu'sius, 345.

Clus'tered. Racemed.

Cly'peate.

Coad'nate. United at the base.

Coarc'tate. Crowded.

Coch'ineal, 324, 4th.

Coccin'eous. Scarlet-colored.

Coch'leate. Coiled spirally, like a snail-shell.

Coc'cum. A grain or seed; tricoccus, 3-seeded, &c.

Cock'le, 222.

Cock's'-comb, 84, *a*.

Cœru'leus. Blue.

Cof'fee, 186, *a*.

Coher'ing.

Col'chicum, 201.

Coleop'tile. From *koleos*, an envelope, and *ptilon*, a bud.

Co'leorrhize. From *koleos*, an envelope, and *riza*, a root, 90, Fig. 121, *c*.

Colli'nus. Growing on hills.

Col'lum, 30.

Col'or of *flowers*, *fruits*, *roots*, 141.

Col'ored. Green.

Col'umbine, 75, 300.

Columel'la, 87, *b*, 90.

Col'umn. The filaments in gynandrous plants united with the style; the whole is termed a column.

Columnif'eræ, 248.

Co'ma. A tuft of bracts on the top of a spike of flowers.

Combina'tion of chemical elements, 143.

Comme'lius, 348.

COMMELYNA'CEÆ, 555.

Com'missure. The inner face of the carpels of umbelliferæ.

Co'mose. Sessile bracts.

Compar'ison of botanical classifications, 155.

——— of organic and inorganic bodies, 372.

——— of natural and artificial classes, 157.

——— of Exogenous and Endogenous plants, 138.

——— of animals and plants, 378.

COMPOS'ITÆ, 469.

Com'pound. Made up of similar simple parts.

——— flowers. Having florets with united anthers, 257, 258, Fig. 111, Fig. 150.

——— fruit, 111.

——— leaf, 54, 55.

——— raceme. When several racemes grow along the side of a peduncle.

——— umbel, 84.

——— petiole. A divided leaf-stalk.

——— peduncle. A divided flower-stalk.

——— pistil, 80, *a*.

Compress'ed. Flattened laterally, Fig. 59, *c*.

Con'cave. Hollowed on one side.

Concep'tacle. Single-valved capsule.

Conchol'ogy. The science which treats of shells.

Cone. A scaly fruit like that of the pine.

Cone-bearing plants, 279.

Conglom'erate. Crowded together.

Con'ic. With a broad base, gradually narrowing to the top like a sugar-loaf.

CONIF'ERÆ, 529.

Conif'erous. Bearing cones.

Con'jugate. In pairs.

Con'nate, 54, *n*.

Connect'ive, 79.

Conni'vent. Converging, the ends inclining toward each other.

Contin'uous. Uninterrupted.

Contort'ed. Twisted.

Contract'ed. Close, narrow.

Convalla'ria, 37, *a*.

Converg'ing. Approaching or bending toward each other.

Con'volute. Rolled into a cylindric form, as leaves in the bud.

CONVOLVULA'CEÆ, 493.

Cor'date. Heart-shaped, side lobes rounded.

Cor'culum, or *Corcle.* The embryo or miniature of the future plant, which is found in seeds often between the cotyledons.

Coreop'sis, Fig. 152.

Coria'ceous. Resembling leather.

Corm, 43.

CORNA'CEÆ, 464.

Cornate'. Horn-shaped.

Cor'nu. A horn or spur.

Cor'nus, 179.

Corol'la, or *corol*, 12, 70.

Corona'tus. Crowned; as the thistle seed is crowned with down.

Cor'tex. (From *corium*, leather, or hide, and *tego*, to cover,) 127.

Cor'tical. Belonging to the bark.

——— vessels, 127.

Coryda'lis. Helmet-like, 252.

Cory'lus, Fig. 205.

Co'rymb, 84, Fig. 94, *a*.

CORYMBIF'ERÆ, 472.

Cot'ton plant, 248.

Cos'tate. Ribbed.

Cotyl'edons, 40, 99, Fig. 100, Fig. 116.

Cow'slip, 186, *a*.

Cran'berry, 207.

CRASSULA'CEÆ, 459.

Cre'mocarpe, 92.

Creep'ing, 35.

Cre'nate. Scalloped, notches on the margin of a leaf pointing neither toward the apex or base.

Cre'nulate. Finely crenate, Fig. 50, *b*.

Crest'ed. Having an appearance like a cock's-comb.

Crini'tus. Long-haired.

Cro'cus, 171.

Crowd'ed. Clustered together.

Crown imperial, 196, *b*.

CRUCIF'ERÆ, 411.

Cru'ciform flowers, 239, Fig. 165.

Crusta'ceous. Small crusty substances lying one upon another.

CRYPTOGA'MIA, 100, 284.

Cryptog'amous plants, 284.

Crys'tals, 117, *c*.

Cucul'late. Hooded, cowled.

Cu'cumber, Fig. 187.

——— tribe, 279.

CUCURBITA'CEÆ, 458.

Cud'bear, 289.

Cu'linary. Suitable for preparations of food.

Culm or *straw.* (From the Greek *kalama*, stubble or straw; Latin, *culmus.*) The stem of grasses, 41.

Culmif'erous. Having culms.

Cune'iform. Wedge-form, with the stalk attached to the point.

Cupres'sæ, 529.

Cup-shaped, 72.

Cu'pule. A cup, as in the acorn, 97, Fig. 112.

CUPULIF'ERÆ, 522.

Curv'ed. Bent inward. See *Incurved.*

Cuscuti'næ, 493.

Cus'pidate. Having a sharp, straight point.

Cu'ticle, 60, 125.

Cya'neus. Blue.

Cyath'iform. (From *cyathus*, a little cup) Shaped like a common wine-glass.

CYCADA'CEÆ, 530.

Cylin'drical. A circular shaft of nearly equal dimensions throughout its extent.

Cyme, 84, Fig. 93; *c*, Fig. 191.

Cy'mose inflorescence, 84.

Cyn'ips, 324, 4th.

CYPERA'CEÆ, 558.

Cyp'eræ, 558.

Cypse'le, 90.

Dac'tylis glomerata, Fig. 131

Dai'sy, 258.
Daph'ne, 209.
Dar'nel, 176.
Dates.
De'bilis. Weak, feeble.
Decan'drous. With ten stamens.
Decaphyl'lous. Ten-leaved.
Decay' of the leaf, 63.
Decid'uous, 58.
Declin'ed. Curved downward.
Decompound'. Composed of compound parts, 55.
Decum'bent. Leaning upon the ground.
Decur'rent. When the edges of a leaf run down the stem, or stalk.
Decur'sive. Decurrently.
Decus'sated. Crossing each other at right angles.
Dedou'blement, 71, 77, *a*. 241.
Def'inite inflorescence, 83, *b*.
Deflect'ed. Bending down.
Defolia'tion, 63.
Deform'ities, 323, 3d.
Dehis'cent. Gaping or opening, 87, *b*.
Deliques'cent Melting away upon exposure to air.
Del'toid. Shaped like the Greek letter Δ, *delta*, 54, *g*.
Demer'sus. Under water.
Den'tate. Toothed; larger than serrate.
Dentic'ulate. Minutely toothed.
Denu'date. Plants whose flowers appear before the leaves; appearing naked.
Depress'ed. Flattened, or pressed in at the top.
Descend'ing sap, 122.
Devel'opment of buds, 119.
——— of organs, 105, 111.
Dextror'sum. Twining from left to right, as the hop-vine.
Diadel'phia, 249.
Diadel'phous. (From *dis*, two, and *adelphia*, brotherhood.) Two brotherhoods.
Diagno'sis. The characters which distinguish one species of plants from another.
Dianthe'ria. (From *dis*, two, and *anther*.) A class of plants including all such as have two anthers.
DIAPENSIA'CEÆ, 495.
DIATOMA'CEÆ.
Dichlamyd'eous. (From *dis*, two, and *chlamys*, a covering.) 66.
DICHON'DRÆ.
Dichot'omous. Forked, divided into two equal branches.
Diclin'ious. Stamens and pistils in separate flowers.
Dicoc'cous. Containing two grains or seeds.
Dicotyle'dons, 154.
Dicotyle'donous plants, 45, 100.
——— plants, growth of, 133.
Did'ymous. Twinned, or double.
Didyna'mia. (From *dis*, twice, and *dunamis*, power.) Two powers. A name appropriated to one of the Linnæan classes.
Dierc'sil, 92.
Diercsil'ia, 92.
Dif'ference between plants and animals.
Dif'form. A monopetalous corolla whose tube widens above gradually, and is divided into unequal parts; any distorted part of the plant.
Diffract'ed. Twice bent.
Diffus'ed. Spreading.
Diffu'sion of seeds, 103, *a*, *b*.
Diges'tion, 61.
Dig'itate. Like fingers. When one petiole sends off several leaflets from a single point at its extremity, 56, *m*.
Digyn'ia. Having two pistils.
Dimid'iate. Halved.
Diœ'cious. Having staminate and pistillate flowers on different plants.
Dion'æa, 219.
DIOSCOREA'CEÆ, 548.
Diosco'rides, 332.
DIPSA'CEÆ.
Discharge' of pollen, 81.
Dis'coid. Resembling a disk, without rays.
Diseas'es of plants, 324.
Disk. The whole surface of a leaf, or of the top of a compound flower, as opposed to its rays, 75, *a*, 85.
Disperm'ous. Containing two seeds.
Dissep'iment, 87, *b*.
Dissil'iens. A pericarp, bursting with elasticity, as the Impatiens.
Dis'tichous. Growing in two opposite ranks or rows.
Divar'icate. Diverging so as to turn backward.
Diverg'ing. Spreading; separating widely.
Diur'nus. Enduring but a day.
Dodecan'dria, 224.
Dog'wood, 179, Fig. 191.
Dor'sal suture, 80, Fig. 98.
Dot'ted. See *Punctate* and *Perforated.*
Double flowers, 78, *a*.
Droop'ing. Inclining downward, more than nodding.
DROSERA'CEÆ, 414.
Dru'paces, 95.
Drupe, 95.
Dru'peole. A little drupe, Fig. 114.
Drupa'ceous. Resembling or bearing drupes.
Ducts, 30, 118.
——— moniliform, 118.
Dul'cis. Sweet.
Dumo'sus. Bushy.
Du'plex. Double.
Dura'men, 129.
Dura'tion of leaves, 58.

Earth, 114, *a*.
EBENA'CEÆ, 477.
Eb'ony, 254.
Ebur'neous. Ivory-white.
Ech'inate. Beset with prickles.
Ecos'tate. Without nerves or ribs.
Ed'ible. Good for food, esculent.
Effect' of light, 62, *b*.
——— of oxygen upon the color of leaves, 58
Egg plant, 185.
Egyp'tian lily, 68, 276.
E'gret or *Ai'grette*, 102.
ELATINA'CEÆ, 417.
El'der, 191.
ELEAGNA'CEÆ, 509.
El'ephant's foot, 265.
Eleva'tion corresponding to latitude in its effect on vegetables, 321.
Ellip'tic. Oval, 54, *d*.
Elon'gated. Exceeding a common length.
Emar'ginate. Having a notch at the end, retuse
Em'bryo, 101.
Emol'lient. A medicine which softens and relaxes the animal fiber.
Empedo'cles, 331.
EMPETRA'CEÆ, 520.
Enchant'er's night-shade, 167.
En'docarp, 87, *a*.
Endog'enous, 100.
——— stem, 45, 135, 136.
Endos'mosis, 120.
Endosmot'ic process, 120.
En'dosperm, 99.
Eno'dis. Without joints or knots
En'siform. Sword-form, two-edged, as in the flag and iris.
Entire'. Even and whole at the edge.
Entire' vessels, 118.
Entomol'ogy. The science which treats of insects, 376.

Ep'i. A Greek word signifying upon; often used in composition.
Ep'icarp. (From *epi*, upon, and *karpos*, fruit.) 87, *a.*
Epider'mis. (From *epi*, upon, and *derma*, skin.) 125.
Epiden'drum, 39.
Epig'ynous. (From *epi*, upon, and *gynia*, pistil.) 77.
——— corolla. 83.
Ep'iphytes, 39, 270.
Ep'isperm. (From *epi*, upon, and *sperma*, seed.)
Equinoc'tial flowers. Opening at stated hours each day.
EQUISETA'CEÆ, 561.
E'quitant. Opposite leaves alternately inclosing the edges of each other.
Erect'. Straight; less unbending than strictus.
Er'got, 324, 5th.
ERICA'CEÆ, 475.
ERIOCAULONA'CEÆ, 557.
Ero'ded. Appearing as if gnawed at the edge.
Etai'ron, 93.
Etair'ronnair, 93.
Eupato'rium, Fig. 194.
Euphor'bia, 92, Fig. 204.
EUPHORBIA'CEÆ, 519.
E'vening primrose, 206.
Ev'ergreen. Remaining green through the year, 58, 304.
Excava'tus. Hollowed out.
Exhala'tion, 61.
Exog'enous stem, 45.
——— plants, 138.
Exosmo'sis, 120.
Exot'ic. Plants that are brought from foreign countries.
Expand'ed. Spread.
Exsert'ed. Projecting out of the flower or sheath, 78, *a.*
Extrorse', 79, *a.*
——— of the bud, 46, *b.*
——— of the potato, 35, *a.*
Eye, 99.

Facti'tious. (From *facio*, to make.) Not natural, produced by art.
Fal'cate. Sickle-shaped; curved.
Fall'ing of the leaf, 63.
——— of compound leaves, 55.
Fari'na. (From *far*, corn.) Meal or flour. A term given to the meal-like parts of wheat and other farinaceous seeds and pollen.
Fas'cicle. A bundle, 84, Fig. 94, *c.*
Fascic'ulate. Collected in bundles.
——— root, 35, *b.*
Fastig'iate. Flat-topped.
Favo'sus. Deeply pitted.
Feath'er-veined, 53.
Feb'rifuge. (From *febris*, a fever, and *fugo*, to drive away.) That which possesses the property of abating fever.
Fec'ula. The nutritious part of wheat and other seeds.
Ferns, 284, 285.
Fer'tile. Pistillate, yielding fruit.
——— flowers, 81, *c.*
Fertiliza'tion of the fig, 81, *c.*
Ferru'ginous. Iron, rust-like.
Fi'bers, 23, 116.
Fi'brils, 30.
Fi'brous root, 33.
Fi'bro-vas'cular tissue. Spiral vessels, with woody tissue.
Fig, 282, 113.
Fil'ament. The slender, thread-like part of the stamen, 78.
Fil'ices. (From *filum*, a thread.) Ferns, 569.
Fil'iform. Thread-like.
Fim'briate. Fringed.
Fis'tulous. Tubular, Fig. 60, *a.*
Flabel'liform. Fan-shaped, 54, *r.*
Flac'cid. Too slender to support its weight
Flagel'liform. Like a whip-lash.
Flam'meous. Flame-colored.
Fla'vous. Yellow.
Flax, 193.
Flex'uous. Undulate.
Flo'ra. In botany, a description of flowers.
Flo'ral leaf. See *Bract.*
——— axis, 84, *a.*
——— envelope, 66.
Flo'ret. A small or imperfect flower.
Flo'rist. One who cultivates flowers.
Flos'cular. A tubular floret.
Flow'er, 66.
——— bud, 48, *a.*
——— stalk. See *Peduncle.*
Flow'ers for analysis, 27.
——— of spring, 296.
——— of summer, 301.
——— of autumn, 303.
Flow'erless plants, 154.
Fluvia'les. Ap. 24.
Flu'id parts of vegetables, 119.
Folia'ceous. Leafy.
Fo'liate, 54.
Folif'erous. Leaf-bearing.
Fo'lioles. Leaflets; a diminutive of *folium*. leaf. The smaller leaves which constitute a compound leaf.
Fo'lium. Leaf.
Fol'licle, 93.
Food of plants, 62, *c.*
Foot'-stalk. Peduncle or petiole.
Fora'men, 99.
Fork'ed. Dichotomous.
Fox-glove, Pl. 7, Fig. 6.
——— tail grass, 175.
Frag'ilis. Breaking easily.
Frond, 41, *c.*
Frondes'cence, 62.
Frondo'se (*Frondosus*). Leafy, or leaf-like.
Fructifica'tion. Organs of, 112.
Fructif'erous. Bearing or becoming fruit.
Fruit, 87.
Frutes'cent. Becoming shrubby.
Fru'tex. A shrub.
Fu'cus, 288, Fig. 162.
——— na'tans, 39.
Fuga'cious. Of short duration, 58.
Ful'cra. Supports; as the petiole, peduncle &c.
Ful'vous. Yellowish.
Fuma'ria, 252.
FUMARIA'CEÆ, 410.
FUN'GI, 286, 220, 568.
Fun'gous. Growing rapidly with a soft texture like the fungi.
Fu'nicle. The stalk which connects the ovule to the ovary.
Fun'nel-form, 72.
Furze, 255.
Fus'cous. Grayish-brown.
Fu'siform root, 34.

Ga'lea. A helmet.
Gært'ner, 348.
Ga'len, 334.
Ga'lium, 180.
Gall-nuts, 324, 4th.
Gamopet'alous, 15, 71.
——— plants, 393.
Gas'es, 312.
Gem'inate. Doubled.
Gemma'ceous. Belonging to a bud
Gemma'tion, 51.
Gen'era and *species.* Natural distinctions, 145.
Gener'ic names, 150, *a.*
——— characters, 162.

Genic'ulate. Forming an angle at the point like a bent knee, 41.
GENTIANA'CEÆ, 492.
Ge'nus. (The plural of genus is *genera.*) A family of plants agreeing in their flower and fruit. Plants of the same genus are thought to possess similar medicinal powers.
GERANIA'CEÆ, 429.
Gera'nium, 246, 247, Fig. 180.
Germ. The lower part of the pistil, which afterward becomes the fruit, 86, 87, 140, *d.*
Germina'tion. The swelling of a seed and the unfolding of its embryo, 114.
Ges'ner, 344.
GESNERIA'CEÆ, 484.
Gi'ant-fennel, Pl. 2, Fig. 3.
Gib'bous. Enlarged.
Gills, 290.
Gin'ger, 165.
Gird'ling trees, 127, *a.*
Glabel'lous. Bald, without covering.
Gla'brous. Sleek, without hairiness.
Glands, 64, *a*; 118, *a.*
Glan'dular. Furnished with glands.
Glau'cous. Sea-green, mealy, and easily rubbed off.
Glo'bose. Round or spherical.
Glom'erate. Densely clustered.
Glo'merulus, 84
Glossol'ogy. (From *glossa*, a tongue or language, and *logos*, a discourse.)
Gluma'ceæ, 154.
Glume, 68, *a*, 173, Fig. 131.
Glumel'lus, 68, *b.*
Glu'ten, 141.
Glu'tinous. Viscid, adhesive.
Gold'en-rod, 262.
Gon. (From *gonu*, a knee or angle); as pentagon, five-angled; hexagon, six-angled.
Goose-foot, 189.
Graft'ing, 227, 322.
Grain, 176.
GRAMINA'CEÆ, 559.
Gramin'eous. Grass-like; such plants are also called culmiferous.
Grandiflo'rus. Having large flowers.
Gran'ular. Formed of grains, or covered with grains.
Gran'ulated root, 35.
Grape, 187, Fig. 185.
——— vines, 187, *a.*
Grass'es, 173, 236.
Grave'olens. Having a strong odor.
Green principle, 140.
Grega'rious. In flocks; plants growing together in groups.
Groov'ed. Marked with deep lines.
GROSSULA'CEÆ, 454.
Growth of plants, 133.
Groups of plants, 151.
Gru'mose. Thick, crowded.
——— root, 35, *b.*
Gum resins, 140, *e.*
Gums, 140, *d.*
Gymnocar'pes. (From *gumnos*, naked, and *karpos*, fruit.) 89, *a.*
Gymnosper'mia. (From *gumnos*, naked, and *sperma*, seed.) 236, 237.
Gynœ'cium. The pistillate system.
Gynan'dria. Stamens growing upon the pistil, 267.
Gyn'ia. From the Greek, signifying pistil.
Gy'nophore. A term applied to the receptacle when it bears the gynæcium alone.
Gy'nostemium. Column formed by the union of the filaments with the pistil.

Hab'it. The general appearance of a plant, by which it is known at sight.
Habita'tions of plants, 313.
Habita'tio or *Habitat.* The native situation of plants.
Hab'its of plants, 309, 310, 311.
HÆMODORA'CEÆ, 546.
Halora'gæ, 452.
HAMAMELA'CEÆ, 461.
Has'tate. Shaped like a halbert; lanceolate, with a divaricate lobe on each side at the base.
Head. A dense collection of sessile flowers, 84, Fig. 94, *c.*
Heads of flowers, 84, *a*
Heart-wood, 129.
Heat, 114, *a*, 312.
Heath, 208.
Heav'enly bodies, 368.
Helian'thus, 258, 263.
Hel'lebore, 233.
Hel'met; galea. The concave upper lip of a labiate flower.
Hem'atine, 141.
Hem'icarp. Half carpel or fruit.
Hepat'ic. Liver-like.
HEPATICÆ, 566.
Herb, 23.
Herba'ceous. Not woody.
Herb'age. Every part of a plant except the root and fructification.
Herba'rium. A collection of dried plants, 24.
——— labels for, 14.
——— mode of preparing, 24.
Hexag'onal. Six-cornered.
Hi'ans. Gaping.
Hi'lum, 99.
HIPPOCASTA'NÆ.
Hippoc'rates, 331.
Hip'puris, 164.
Hir'sute. Rough-haired.
His'pid. Bristly.
Hoar'y. Covered with white pubescence.
Homog'amous. Syngenesious flowers, all similar, tubular and perfect.
Hol'ly, 182.
Hol'lyhock, 248.
Hon'ey, 75, *a.*
Hood'ed. Cucullate, or cowled.
Hop, 283, Fig. 206.
Hora'rius. Continuing but an hour.
Horn. Elongation like a horn.
Horse-chest'nut, 202.
Hous'tonia cerulea, 178.
House-leek, Pl. 4, Fig. 5.
Hum'boldt's division of regions, 319.
Hum'ilis. Low.
Husk. The larger kind of glume, as the husks of Indian corn.
Hy'alines. Water-color.
Hyber'nalis. Growing in winter.
Hy'brids. Variations produced by fertilizing the ovary of one plant with the pollen of a nearly allied species.
Hydran'geæ, 220.
HYDROCHARIDA'CEÆ, 538.
HYDROPHYLLA'CEÆ, 491.
HYPERICA'CEÆ, 416.
Hyper'icum, 256.
Hy'po. Greek *upo*, under; used in the composition of scientific terms.
Hypocrater'iform. Salver-shaped, with a tube abruptly expanded into a flat border.
Hypog'ynous, 77.

Ichthyol'ogy, 376.
Icosan'dria, 224, *a.*
Illece'bræ, 418.
Im'bricate. Lying over, like scales, or the shingles of a roof.
Imper'fect. Wanting the stamen or pistil.
Impres'sions of leaves, 27.

Incarna'tus. Flesh-colored.
Incis'ed. Cut or gashed; separated by incisions.
Includ'ed. Wholly contained in a cavity; the opposite of exsert.
Incomplete'. Flowers destitute of a calyx or corolla are said to be incomplete.
Incum'bent. Lying across.
Incras'sate. Thickened upward, larger toward the end.
Incurv'ed. Bent inward.
Indehis'cent. (From *indehisco*, not to open.) Fruits which remain closed and entire at maturity.
In'dian corn, 275.
——— pipe, 218.
——— rubber, 140, *c.*
Indi'genous. Native, growing originally in a country.
In'digo, 141.
Individ'ual plant, 149.
In'durated. Becoming hard.
Indu'sium. A covering; plural, *indusia.*
Infe'rior. Below; a calyx or corolla is inferior when it comes out below the germ.
Infer'tile flowers, 81, *c.*
Infla'ted. Appearing as if blown out with wind; hollow.
Inflex'ed. The same as incurved.
Inflores'cence, 82, 83.
Infrac'tus. Bent in, with such an acute angle as to appear broken.
Infundibulifor'mis. Funnel-form.
Infuso'ria, 378.
Insert'ed. Growing out of, or fixed upon, 78.
Inor'ganized substances, 370, 387.
In'teger. Entire.
Internodes', 40, 107.
Interrupt'edly-pinnate. When smaller leaflets are interposed among the principal ones.
Intor'tus. Twisted inward.
Introdu'ced. Not originally native.
Introrse', 79, *a.*
Involu'crum, 68, 190.
Involu'cel. A partial involucrum.
In'volute. Rolled inwards.
Ipo'mea, Fig. 199.
IRIDA'CEÆ, 172, 244, 547.
Irides'cent. (From *Iris*, the rainbow.) Reflecting light.
I'ris, 172, Fig. 212.
Irreg'ular. Differing in figure, size, or proportion of parts among themselves.
Irritabil'ity, 62, *a.*
Ix'ia, 172.

Jag'ged. Irregularly divided and subdivided.
JASMINA'CEÆ, 499.
Jel'ly, 141.
Joints. Knots or rings in culms, pods, leaves, &c.
Ju'das-tree, 216.
JUGLANDA'CEÆ, 521.
Ju'gum. A yoke; growing in pairs.
JUNCA'CEÆ, 554.
Jungerman'nia, 287.
Jus'sieu, 358.
Jus'sieu's division of compound flowers, 266.
——— natural method, 153.
Juxtaposi'tion. (From *juxta*, near, and *pono*, to place.) Nearness of place.

Kalm, 364.
Keel. The under lip of a papilionaceous flower.
Keel'ed. Shaped like the keel of a boat or ship.
Ker'nel. See *Nucleus.*
Kid'ney-shaped. Heart-shaped without the point and broader than long.
Knee. A joint.
Knob'bed. In thick lumps, as the potato.
Knot. See *Joints.*
Label'lum. The lower petal of the orchidaceous plants, formerly called the nectary.
LABIA'TÆ, 489.
La'biate, 72.
——— family, 236, 237, 238.
——— corollas, 72.
Lace-bark tree, 204.
Lacin'iate. Jagged, irregularly torn, lacerated.
Lactes'cent. Yielding a juice, usually white like milk, sometimes red, as in the blood-root.
Lac'teus. Milk-white.
Lactif'erous vessels, 118, 122.
Lacu'nose. Lowered with little pits or depressions.
Lacus'tris. Growing about lakes.
La'dies' ear-drop, 207.
——— slipper, 271, Fig. 210.
Læ'vis. Smooth, even.
Lam'ellated. In thin plates.
Lam'ina, 49.
La'nate. Woolly.
Lance'olate, 54, *e.*
Lance-o'vate. A compound of lanceolate and ovate, intermediate.
Land-plants, 185.
Lanu'ginous. Woolly.
Lat'eral. (From *latus.*) On one side.
La'tex, 122.
Lat'in and *Greek* numerals, 19.
LAURA'CEÆ, 507.
Lau'rel, 213, 218.
Lax. Limber, flaccid.
Leaf-bud, 48, *a.*
——— stalk, 40.
Leaf'let, 54.
Leaf-like appendages, 64.
Leaves, 23.
——— anatomy of, 60.
——— with respect to size, 57.
Leg'ume, 91.
Legu'minous, 91, 253, 254.
——— plants, 250, 253, Fig. 145.
LEMNA'CEÆ, 534.
LENTIBULA'CEÆ, 482.
Lepan'thium. A term used for a petal like nectary; like that of the larkspur and monk's-hood.
Li'ber, 23, 127, 127, *a*, 127, *b.*
Li'chen, 284, 289.
LI'CHENES, 567.
Light, 114, *a.*
Lig'neous. Woody.
Lig'num. Wood.
Lig'ulate. Strap or riband-like, flat, as the florets of the dandelion.
Li'lac, 167.
LILIA'CEÆ, 551.
Lilia'ceous, 73.
——— plants, 196, 197.
——— corolla, 72.
Lil'leus. Yellow.
Lil'y, 15.
——— of the valley, 199, *b.*
Limb. The border or spreading part of a monopetalous corolla.
Limnan'thæ, 428.
LINA'CEÆ, 430.
Lin'ear, 54, *f.*
Linnæ'an classes, 13, 20.
——— system, imperfections of, 155.
Lin'næus, 353.
Lip. The petals in a labiate corolla; the labellum of the orchidaceæ.
Lit'mus, 289.
Littori'bus. Growing on coasts or shores.
Liv'erwort, 287.
Li'vidous. Dark purple.
Liz'ard's-tail, 203.
Lobe. Division of a leaf or petal.

Lob'ed, 54, *o*.
LOBELIA'CEÆ 473
Lobe'lius, 343.
Loc'ulus. (From *locus*, a place.) A small space.
Loga'niæ, 466.
Lo'ment. A pod resembling a legume, but divided by transverse partitions.
Longifo'lius. Long-leaved.
Longis'simus. Very long.
LONI'CERÆ, 465.
LORANTHA'CEÆ, 512.
Lu'cidus. Bright and shining.
Lu'nate, *lu'nulate*. Shaped like a half moon.
Lu'rid. Of a pale dull color.
Lu'teus. Yellow.
LYCOPODIA'CEÆ, 563.
Ly'rate. Pinnatifid, with a large roundish leaflet at the end, 54, *k*.
Lysimach'ia, 186.
Lythra'ceæ, 449.

Macula'tus. Spotted.
Mad'der, 180.
Magno'lia, 233.
MAGNOLIA'CEÆ, 401.
Mal'low family, 248.
Malt'ing, 114, *a*.
MALVA'CEÆ, 421.
Man'drake, 185.
Man'grove, Pl. 5, Fig. 2.
Ma'ple, Fig. 183.
Mares'cent. Withering.
Mar'gin. The edge or border.
Mar'igold, 305.
Mar'itime. Growing near the sea.
MARSILEA'CEÆ, 564.
May-ap'ple, 230.
Medul'la. (From *medulla*, marrow.) The pith or pulp of vegetables. The center or heart of a vegetable.
Medul'lary rays, 42, 231.
MELANTHA'CEÆ, 553.
MELASTOMA'CEÆ, 448.
MELIA'CEÆ, 425.
Mellif'erous. (From *mel*, honey.) Producing or containing honey.
Mem'brane, 23, 116.
Membra'neous fiber, 118.
MENISPERMA'CEÆ, 403.
MESEMBRYANTHEMA'CEÆ, 420.
Mes'ocarp, 87, *a*.
Mes'osperm, 99.
Metamor'phosis, 86, 323, 4th.
——— of organs, 323.
Mid'rib, 53.
Milk'weed, 271.
Minia'tus. Scarlet, vermilion color.
Mimo'sæ, 444.
Mind. Its faculties, 1.
—— science which relates to, 8.
Mir'bel, 223.
Mis'tletoe, 282.
Modifica'tions of the flower commonly called nectaries, 75.
Mol'lis. Soft.
Monadel'phia, 242.
Monadel'phous. Stamens united.
Monil'iform. Granulate; strung together like beads.
Monoceph'alous. (From *mono*, one, and *kephale*, head.) The term is applied to pericarps which have but one summit, as the wheat; the anemone has as many summits as styles; it is polycephalous.
Monochlamyd'eous. (From *monos*, one, and *chlamys*, a covering.) 66.
Monocli'nous. Stamens and pistils on the same plant, 153.
Monocotyle'dons, 100, 154.
Monocotyle'donous plants, 45.
——— growth of, 135.
Monœ'cious. Having pistillate and staminate flowers on the same plant.
Mon'ograph. A full account of a genus or tribe of plants.
Monopet'alous, 71.
Monophyl'lous. Consisting of one leaf.
Monosep'alous. A calyx which appears to consist of but one sepal, but is gamosepalous.
Monosper'mous. One seed to a flower.
Monotro'peæ, 475.
Monta'nus. Growing on mountains.
Moon-form. See *Crescent-form*.
Mo'ræ, 528.
Moss'es, 248, 286.
Mount'ains. Vegetation of, 321.
Mucro'nate. Having a small point or prickle at the end of an obtuse leaf.
Mul'berry, 276, Fig. 114.
Mul'lein, 185, *b*.
Multiflo'rus. Many-flowered.
Mul'tiplex. Many-fold, petals lying over each other in two rows.
Mul'tus. Many.
Mu'ricate. Covered with prickles.
MUSA'CEÆ, 543.
MUS'CI, 565.
Mush'room, 290. Pl. 3, Figs. 7, 8, and 9. Pl. 4 Fig. 7.
Myce'lium. The vegetation of Fungi.
MYRICA'CEÆ, 523.
MYRTA'CEÆ, 447.

NAIADA'CEÆ, 535.
Na'ked. Destitute of the usual covering or appendage.
Na'nus. Dwarfish, very small.
Nap'iform. Resembling a turnip.
Narcot'ics, 231, *a*.
Narcis'sus, Pl. 7, Fig. 7.
Nastur'tion, 209.
Na'tant. Floating.
Nat'ural character. That which is apparent, having no reference to any particular method of classification.
Nat'ural family, 157.
——— orders, 157.
——— —— of Linnæus, 153.
——— —— of De Candolle, 153.
——— —— of Jussieu, 153.
——— families of plants, 152.
——— history, 9.
——— science, 365.
——— system, 390, 391, 392.
Na'ture, 367.
Nat'uralists formerly inclined to skepticism, 366.
NELUMBIA'CEÆ, 406.
Nelum'bo, Pl. 8, Fig. 6.
Nemoro'sus. Growing in groves; often given as a specific name, as *Anemone nemorosa*; the ending in *a* denotes the adjective as being in the feminine gender; the adjective in Latin varying its termination to conform to the gender of the substantive.
Nerva'tion, 53.
Nerves, 53.
Nerv'ed. Marked with nerves, so called, though not organs of sensibility like the nerves in the animal system.
Net'tle, 64, *d*. Fig. 207.
Net-veined, 53.
Nic'titans. To twinkle or wink. Applied as a specific name to some sensitive plants.
Ni'ger. Black.
Nit'idus. Glossy, glittering.
Ni'trogen, 143.
Niv'eus. Snow-white.
Nod'ding. Partly drooping.

Nodes, 40, 107.
No'dose. Having numerous joints or nodes.
No'men. A name.
Nor'mal law respecting the whorls of the flower, 66.
——— position of stamens and pistils, 77.
——— situation of the bud, 46.
——— process of development, 104, 108.
Notch'ed. See *Crenate.*
Nucamenta'ceous. Producing nuts.
Nu'cleus. Nut, or kernel, 99.
Nu'cules. Little nuts.
Nu'dus. See *Naked.*
Nut, Nux. Nucleus.
Nu'tant. Nodding, pendulous.
Nutri'tion, 140.
——— organs of, 112.
Nyctan'thes, 68, *a.*
Nymph'æa, 231, Fig. 173.
NYMPHÆA'CEÆ, 407.
NYSSA'CEÆ, 511.

Ob. A prefix which denotes the inversion of the usual position; as, *obcordate*, which signifies *inversely cordate.*
Obcon'ic. Conic, with the point downward.
Obcor'date. Heart-shaped, with the point downward.
Oblan'ceolate. Lanceolate, with the base the narrowest.
Oblique'. A position between horizontal and vertical.
Ob'long. Longer than wide.
Obo'vate. Ovate, with the narrower end toward the stem, or place of insertion.
Ob'solete. Indistinct.
Obtuse'. Blunt, rounded, not acute.
Ochra'ceous. Color of yellow ochre.
O'chrea, 201.
O'dor of flowers, 74.
Odora'tus. Scented, odorous.
Of'fice of the leaf, 50, 60, 61.
——— of the pollen, 81, *b.*
Officina'lis. Usually the species in a genus most valued in medicine or the arts.
Oid, Oi'des. This termination imports resemblance, as *petaloid*, like a petal; *thalictroides*, resembling a thalictrum, &c.
Oils, 140, *c.*
—— vegetable, 193, 326.
OLEA'CEÆ, 500.
Ol'ive, 168, *a.*
ONAGRA'CEÆ, 451.
Opaque'. Not transparent.
Oper'culum, 286.
O'pium, 141.
Op'posite. Standing against each other on opposite sides of the stem.
Orbic'ular. Circular.
——— leaf, 54, *a.*
Or'chard-grass, 175.
ORCHIDA'CEÆ, 540.
Orchid'eous. Petals like the orchis.
Or'chis plants, 269, 270.
Or'ders of Linnæus, 14.
Or'ganized substances, 370.
Or'gans of fructification, 112.
OROBANCHA'CEÆ, 483.
Os. A bone. A mouth.
Osmun'dæ, 562.
Os'seous. Bony, hard.
O'vary, 80, *a.* 86, 89.
O'vate, 54, *d.*
Ovip'arous. Animals produced from eggs, as birds, &c.
O'vules, 86, 99, 111.
O'vum. An egg.
OXALIDA'CEÆ, 431.
Ox'alis Fig. 181.
Ox'ygen, 114, *a.* 122.
——— essential to germination, 312
——— inhaled by leaves, 62.

Pæ'ony, 233.
Pa'læa, 68, *b.* 173.
Pal'ate. A prominence in the lower lip of a personate corolla, closing or nearly closing the throat.
Palea'ceous. Chaffy.
PALMA'CEÆ,
Pal'mate. Hand-shaped; resembling the hand with the fingers spread, 54, *l.*
Palmel'la nivalis, 318.
Palms, 198, Fig. 137.
Palm-Sunday, 304, *a.*
Palus'tris. Growing in swamps and marshes.
Panex'tern. The outer covering of the pericarp, 95.
Pan'icle, 84, Fig. 92, *b.*
Pan'icled. Bearing panicles.
Panin'tern. The inner covering of the pericarp, 95.
Pan'sy, 188.
Papaw'-tree, Pl. 4, Fig. 1.
PAPAVERA'CEÆ, 409.
PAPAYA'CEÆ, 457.
Papil'io. A butterfly.
Papiliona'ceæ, 444.
Papiliona'ceous. Butterfly-shaped, 73, 253, Fig. 148
Pap'illose. Covered with protuberances.
Pap'pus, 102.
Papy'rus, 275.
Paraphy'ses, 565, Fig. 217.
Par'asites, 39, 354, 5th.
Paren'chyma, 53, 117.
Parisit'ic. Growing on another plant, and deriving nourishment from it.
Par'is, 212.
Parnas'sia, 192.
Par'tial. Used in distinction to general.
Parti'tion. The membrane which divides pericarps into cells, called the dissepiment.
Part'ed. Deeply divided; more than cleft.
Parts of the calyx, 67, *b.*
—— of the pistil, 80.
—— of the stamen, 79, *a.*
PASSIFLORA'CEÆ, 456.
Pas'sion-flower, 245. Pl. 6, Fig. 4.
Pat'ens. Spreading, forming less than a right angle.
Pau'ci. Few in number.
Pea, 254.
Pec'tinate. Like the teeth of a comb, intermediate between fimbriate and pinnatifid.
Ped'ate. Having a central leaf or segment, and the two side ones, which are compound, like a bird's foot.
Ped'icel, 41, *a.*
Pedun'cle, 41, *a.*
Pel'licle. A thin membraneous coat.
Pellu'cid. Transparent or limpid.
Pel'tate. The petiole attached to some part of the under side of the leaf, Fig. 53, *a.*
Pend'ent. Hanging down, pendulous.
Pen'ciled. Shaped like a painter's pencil or brush.
Penninerv'ed. Having the lateral nerves pinnately arranged.
Pe'po, 96.
Pep'per, 170, 188.
Peregri'nous. Foreign, wandering.
Peren'nial roots, 31.
Per'fect flower, 67.
——— wood, 129.
Perfo'liate. Having a stem running through the leaf; differs from connate in not consisting of two leaves.
Per'forate. Having holes as if pricked through

differs from punctate, which has dots resembling holes.
Pe'ri. Around.
Per'ianth, 68.
Per'icarp, 86, 87.
Perid'ium. The round membraneous case which contains the seeds of some mushrooms.
Perig'ynous. (From *peri*, around, and *gynia*, pistil.)
—— corolla, 83.
Periph'ery. The outer edge of the frond of a lichen; the circumference of a circle.
Per'isperm. (From *peri*, around, and *sperma*, seed.) Around the seed. Skin of the seed.
Peristo'mium. The fringe or teeth around the mouth of the capsule of mosses, under the lid.
Per'manent. Any part of a plant is said to be permanent when it remains longer than is usual for similar parts in most plants.
Persist'ent, 58.
Per'sonate. (From *persona*, a mask.) 72, 236, 238.
Perspira'tion of plants, 121.
Pet'al, 12, 71.
Pet'iole, 41, *b*.
Phænog'amous, 20.
Philadel'phæ, 460.
Philos'ophers of Greece, 331.
Phle'um pratense, 175.
Phyl'la. The Greek word for leaves.
Phyllotax'is, 49.
Physiol'ogy. Derived from the Greek, a knowledge of nature.
Physiolog'ical Botany, 10.
PHYTOLACCA'CEÆ, 502.
Phytol'ogy. The science which treats of the organization of plants.
Phy'ton. (From the Greek *phuton*, a plant.) A plantlet first formed in the seed, 52.
Pig-weed, 189.
Pi'leole, 90, Fig. 121.
Pi'leus. The hat of a fungus.
Pil'lar. See *Columella* and *Column.*
Pi'lose. Hairy, with distinct, straightish hairs.
Pi'lus. A hair, 290.
Pine, 54, *i*; 279.
—— apple, 97.
Pink, 14, 220, Fig. 178.
Pin'na. (From *pinna*, a wing.) Segments of a pinnate leaf.
Pin'nate, 55, Fig. 59.
Pinnat'ifid. Cleft in a pinnate manner, but the segments are united or confluent at the base, 54, *j*.
PIPERA'CEÆ, 515.
Pis'til, 80, 111, Fig. 87.
Pis'tils. Transformed leaves, 80.
Pis'tillate. Having pistils, but no stamens.
Pistillid'ia.
Pitch'er plant, 54, *t*; 315.
Pith, 130.
Placen'ta, 80, 80, · ; 89.
Plane. Flat, with an even surface.
PLANTAGINA'CEÆ, 480.
Plan'tain, 178.
Plants, affected by the state of the atmosphere, 306, 308.
——, by the sun, 307.
——, first account of, 330.
—— differ from animals, 385.
—— confined to particular places, 317.
—— peculiar to their native regions, 318.
—— of cold climates, 314, 317, 318.
—— of warm countries, 314, 317.
—— of the torrid zone, 319.
Pli'cate. Folded like a fan, Fig. 54, *c*.
Plin'y, 335.
PLUMBAGINA'CEÆ, 481.
Plu'mose. Feather-like.
Plu'mula, or *Plume*, 101.
Plu'rimus. Very many.
Poa, 175.
Pod, 91.
Pode'tia. The pedicels which support the frond of a lichen.
Pod'osperm. (From *podos*, a part, and *sperma*, seed.) Pedicel of the seed. The same as the funicle.
PODOSTEMACEÆ, 518.
Poi'son hemlock, 190.
Poi'sonous plants, 26, 190, 229.
Poke-weed, 223.
POLEMONIA'CEÆ, 494.
Pol'len, 79, 81; 81, *a*.
Pollin'ia. Masses of pollen, as seen in the Orchidaceæ.
Po'lus. Many.
Polyan'drous. Many stamens inserted upon the receptacle.
Polyceph'alous. See *Monocephalous.*
Polydel'phia, 256.
Polyga'la, 252.
POLYGALA'CEÆ, 443.
Polyga'mia, 26.
Polyg'amous. Having some flowers which are perfect, and others staminate, pistillate, or neuter.
POLYGONA'CEÆ, 506.
Polymor'phous. Changeable, assuming many forms.
Polypet'alous, 71.
Polyphyl'lous. Having many leaves.
Polysep'alous. A calyx.
Pome. A pulpy fruit, containing a capsule, as the apple, 96.
Pomegran'ate, 226.
Pond-lily, 231, 303.
PONTEDERIA'CEÆ, 552.
Pop'lar, 283, Pl. 3, Fig. 1.
Pop'py, 17, 231.
Pores. Apertures in the cuticle for perspiration
Po'rous. Full of holes.
—— vessels, 118.
Por'rected. Extended forward.
PORTULACCA'CEÆ, 419
Pota'to, 185.
Præflora'tion, 66.
Præmorse' root, 34.
Pras'inus. Green, like a leek.
Praten'sis. Growing in meadow land.
Prick'les, 64, *b*.
Prick'ly pear, 225, Pl. 1, Fig. 7.
Pri'mine. The outer integument of the ovule.
Primor'dial leaves, 40, 52, 101.
PRIMULA'CEÆ, 479.
Prin'ciple of organic life, 139.
Prismat'ic. Like a prism, with several angles.
Probos'cis. An elongated nose or snout, applied to projecting parts of vegetables.
Pro'cess. A projecting part.
Procum'bent. Lying on the ground.
Produc'tion by bulbs, 37, *c*.
Prolif'erous. A flower is said to be proliferous when it has smaller ones growing out of it.
Prop. Tendrils and other climbers.
Prop'er juices of vegetables, 124.
Pro'tea, 180.
Prox'imate principles, 140.
Prox'imus. Near.
Pru'nus, 226.
Pseu'do. Prefixed to a word, implies obsolete or false.
Pseu'do-pinnate. Falsely or imperfectly pinnate, the leaflets confluent, or not articulated at the base.
Pubes'cence, 64, *g*.
Pubes'cent. Hairy, downy, or woolly.
Pulp. The juicy cellular substance of berries and other fruits.

Pulpy fruits, 86, 87.
Pulver'ulent. Turning to dust.
Pu'milus. Small, low.
Punc'tate. Appearing dotted. See *Perforated.*
Pun'gent. Sharp, acrid, piercing.
Purpu'reus. Purple.
Pusil'lus. Diminutive, low.
Puta'men. A hard shell.
—— 87, *a.*
Pyrid'ion, 96.
Pyr'iform. Pear-shaped.
Pyro'læ, 475.
Pythag'oras, 220.
Pyx'ides, 91.

Quadran'gular. Having four corners or angles.
Quater'nate. Four together.
Qui'nate. Five together.
Quincun'cial. When the pieces of the flower are five in number, of which two are interior, two exterior, and one covered at one edge by one of the exterior, while its other edge overlies that of one of the inner parts.

Ra'ceme. (From *rax*, a bunch of grapes, a cluster.) 84, Fig. 92, *a.*
Race'mose. Resembling a raceme.
Ra'ces, 322.
Ra'chis. The common stalk to which the florets and spikelets of grasses are attached; as in wheat-heads. Also, the midrib of some leaves and fronds, 84, 85, Fig. 94, *c.*
Ra'diate. The ligulate florets around the margin of a compound flower.
Ra'diated animals.
Rad'ical. Growing from the root.
Rad'icle. (From *radix*, a root.) The part of the embryo which becomes the root; the minute fibers of roots are called radicles, 101, 114.
Ra'meus. Proceeding from the branches.
Ramif'erous. Producing branches.
Ra'mose. Branching.
—— root, 32.
Ra'mus. A branch.
Ranuncula'ceæ, 400.
Ranun'culus family, 233.
Raph'ides, 117, *c.*
Ray. The outer margin of compound flowers.
—— 349.
Recep'tacle. The end of a flower-stalk; the base to which the different parts of fructification are usually attached.
Recep'tacle, 85.
—— of the fruit, 87, *b.*
Reclin'ed. Bending over, with the end inclining toward the ground.
Rec'tus. Straight.
Recurv'ed. Curved backward.
Red'-bud (Judas'-tree), 216.
Red'-snow, 318.
Reed, 175.
Reflex'ed. Bent backward, more than recurved.
Refrig'erant. (From *refrigero*, to cool.) Cooling medicines.
Regions of the wine-grape, 187, *a.*
Reg'mate, 92.
Ren'iform. Kidney-shaped; heart-shaped, without the point.
—— leaf, 54, *b.*
Repand'. Slightly serpentine, or waving on the edge.
Repens'. Creeping.
Reproduc'tive organs, 65.
Reseda ceæ.
Res'in, 140, *c.*
Respira'tion of plants, 61, 122.
Resu'pinate. Upside down.
Retic'ulate. Veins crossing each other like network.
Retuse'. Having a slight notch in the end, less than emarginate, Fig. 52, B.
Revers'ed. Bent back toward the base.
Rev'olute. Rolled backward or outward.
Rhamna'ceæ, 441.
Rhizo'ma, 35, 43.
Rhizophora'ceæ, 450.
Rhododen'dræ, 475.
Rhododen'dron, 218.
Rhom'boid. Diamond-form.
Rib. A ridge caused by projecting veins.
Rib'and-like. Broader than linear.
Rice, 200.
Rig'id. Stiff, not pliable.
Ring. The band around the capsules of ferns.
Rin'gent. (From *ringo*, to grin.) 72.
—— flowers, 236, 237.
Rivan'nus, 349.
Roots, 30, 31, 38.
—— of grasses, 173.
——, viviparous, 173.
——, stoloniferous, 173.
Root'let. A fiber of a root, a little root.
Rosa'ceæ, 445.
Rosa'ceous, 73.
Rose, 15.
—— tribe, 228.
Ro'seus. Rose-colored.
Ros'tel. The pointed part of the embryo, which tends downward at the first germination of the seed.
Ros'trate. Having a protuberance like a bird's beak.
Rot, 324, 5th.
Ro'tate. (From *rota*, a wheel.) Wheel-form.
Rotun'dus. Round.
Rough-leaved plants, 184.
Rubia'ceæ, 466.
Ru'bra. Red.
Ru'bus. Red.
Rue, 216, *a.*
Ru'fous. Reddish-yellow.
Ru'gose. Wrinkled, Fig. 62, *a.*
Run'cinate. Having large teeth pointing backward, as the dandelion, Fig. 56, *c.*
Run'ner, 43.
Rupes'tris. Growing among rocks.
Rust, 324.
Ruta'ceæ, 433.

Sage, 167, Fig. 197.
Sag'ittal. Arrow-form.
Sagitta'ria, 278.
Sag'ittate, 54, *h.*
Salica'ceæ, 525.
Salicor'nia, 165.
Salif'erous. Bearing or producing salt.
Sal'sus. Salt-tasted.
Salts contained in plants, 312.
Salv'er-form. Corolla with a flat spreading border proceeding abruptly from the top of a tube.
—— ——, 72.
Sam'ara, 90.
Sam'phire, 165.
Santala'ceæ, 510.
Sap, 119, 119, *a*; 121, 122, 123, 128.
——, its chemical composition, 142.
—— wood, 119.
Sapinda'ceæ, 438.
Sa'por. Having taste.
Sarmentose'. Running on the ground, and striking root from the joints only, as the strawberry.
Sar'cocarp. (From *sarx*, flesh, and *karpos*, fruit.) 87.
Sarrace'nia, 230, Fig. 174.
Sarracenia'ceæ, 408.
Sarsaparil'la, 283.
Sas'safras, 213.
Saurura'ceæ, 514.

Sauru'rus, 203.
SAXIFRAGA'CEÆ, 460.
Sca'ber, or *Sca'brous.* Rough.
Scales, 64, *c.*
Sca'ly bulb, 37.
Scan'dens. Climbing.
Scape, 41.
Sca'rious. Having a thin membraneous margin.
Scat'tered. Standing without any regular order.
Scen'ery of American forests, 53.
Sci'ons. Shoots proceeding laterally from the roots or bulb of a root.
Scour'ing-rush, 285.
SCROPHULARIA'CEÆ, 487.
Sea-weeds, 288, Pl. 8, Figs. 8, 9, 10, 11.
Se'cund. Unilateral, arranged on one side only.
Sedge, 275.
SEED, 98, 103, 104, 114.
Seg'ment. A part or principal division of a leaf, calyx, or corolla.
Sem'inal leaf, 52.
Semper'virens. Living through the winter, and retaining its leaves.
Sen'eca snakeroot, 271.
Sen'na, 216.
Sen'sitive fern, 285.
——— plant, 216.
Sep'al. Leaves or divisions of the calyx.
Sep'als, 67.
——— changed to petals, 109.
——— and petals modified leaves, 69.
Sep'ta. Partitions that divide the interior of the fruit.
Sep'tas, 204.
Septif'erous. Bearing septa.
Ser'rate. Notched like the teeth of a saw.
Ser'rulate. Minutely serrate.
Ser'rulated, 54, *d.*
Ses'amæ, 485.
Ses'sile. Sitting down; placed immediately on the main stem, without a foot-stalk.
Se'ta. A bristle.
——— 68, *b.*
Seta'ceous. Bristle-form.
Se'tose. Covered with bristles.
Shad-blossom, 300.
Shaft. A pillar, sometimes applied to the style.
Sheath. A tubular or folded leafy portion including within it the stem.
Sheath'ing, 54, *f.*
Shoot. Each tree and shrub sends forth annually a large shoot in the spring, and a smaller one from the end of that in June.
Shrub. A plant with a woody stem, branching out nearer the ground than a tree, usually smaller.
Sic'cus. Dry.
Side'-saddle flower, 230, Pl. 3, Fig. 5.
Silene', 221.
Sil'icle, 91, 239, 240.
Siliculo'sæ, 411.
Silique', 91, 239, 240.
Siliquo'sæ, 411.
Silk-cot'ton-tree, 248, *a.*
Sil'ver-tree, 180.
Sim'ple. Not divided, branched or compounded.
Sin'uate, 54, *p.*
Si'nus. A bay; applied to the plant, a roundish cavity in the edge of the leaf or petal.
Skel'eton of the leaf, 60.
Sleep of plants, 62, *d.*
SMILA'CEÆ.
Smith, Sir J. E., 355.
Smut, 324, 5th.
Snake'root, 252, 271.
Snow'-ball, 191.
Sobo'les, 43.
Sol'omon's-seal, 199, *b.*
SOLANA'CEÆ, 496.
So'ri. Plural of sorus; fruit-dots on ferns.
So'rose, 97.
Spa'dix, 68, Fig. 96.
Spa'tha, 68, Fig. 96.
Spat'ulate. Large, obtuse at the end, gradually tapering into a stalk at the base.
Spe'cies, 149.
——— number of, 146.
Specif'ic. Belonging to a species only.
——— names, 150, *a.*
Sper'ma. Seed.
Sper'moderm, 99.
Spice-bush, 213.
Spi'derwort, 199.
Spige'liæ, 466.
Spike, 83, *b.*
Spike'let. A small spike, 175.
Spin'dle-root, 34.
Spin'dle-shaped. Thick at top, gradually tapering, fusiform.
Spine. A thorn or sharp process growing from the wood, 64, *c.*
Spines'cent. Bearing spines or thorns, Fig. 50, *a.*
Spino'sus. Thorny.
Spi'ral. Twisted like a screw.
——— vessels, 118.
Sponge, 378.
Spon'gioles, 30, 40.
Sporan'gia, 284.
Spore-cases, 285, Fig. 217, Fig. 218.
Spor'ules. That part in cryptogamous plants which answers to seeds, 286.
Spur. A sharp hollow projection from the corolla, formerly called a nectary.
Spur'red rye. A morbid swelling of the seed, of a black or dark color, sometimes called *ergot;* the black kind is called the malignant ergot. Grain growing in low, moist ground, on new land, is most subject to it.
Squa'mose. Scaly.
Squa'mulæ, 68, *b.*
Squar'rose. Ragged, having divergent scales.
Squill, 199.
Sta'mens, 79.
——— regarded in the Linnæan classes, 77, *c.*
——— modified leaves, 77, *a.*
——— and pistils, 76, 77.
Stam'inate. Having stamens without pistils.
——— ament, Fig. 95, *b.*
Stand'ard. See *Banner.*
STAPHYLA'CEÆ, 439.
Starch, 99.
Stella'tæ, 180, 466, Fig. 54, *s.*
Stel'late. Like a star.
Stem, 40.
Stem'less. Having no stem.
Ster'il. Barren.
Stig'ma, 80, *c.*
Stings, 64, *d.*
Stipe, 41, *c;* 102, 290.
Stip'itate. Supported by a stipe.
Stip'ule, 64, Fig. 59. *a;* Fig. 64.
Sto'lon, 43.
Stolonif'erous. Putting forth scions, or running shoots.
Stoma'ta, 23, 50, 61.
Stramin'eous. Straw-like, straw-colored.
Stramo'nium, 185.
Strap-form. Ligulate.
Stra'tum. A layer: plural, strata.
Straw'berry, 228.
Stri'ate. Marked with fine parallel lines.
Stric'tus. Stiff and straight, erect.
Stri'gose. Armed with close, thick bristles.
Strobi'lum, 97.
Struc'ture of the leaf, 50–60.
Style, 80, *b.*
Styli'des. Plants with a very long style
STYRACA'CEÆ.

Sua'vis. Sweet, agreeable.
Sub. Used as a diminutive; it may be rendered by *somewhat*; it also signifies *under*, or *less than.*
Subacute'. Somewhat acute.
Sub'erose. Corky.
Submers'ed. Growing under water.
Subses'sile. Almost sessile.
Subterra'nean. Under ground.
——— stem, 38, 43, 201.
——— leaf-buds, 48.
Sub'tus. Beneath.
Sub'ulate. Awl-shaped, narrow and sharp-pointed. See *Awl-form.*
Suc'culent. Juicy; it is also applied to a pulpy leaf, whether juicy or not.
Suck'er. A shoot from the root by which the plant may be propagated.
Suffru'ticose. Somewhat shrubby; shrubby at the base; an undershrub.
Su'gar, 140.
——— cane, 176.
Sul'cate. Furrowed, marked with deep lines.
Sun'flower, 258, 263.
Su'per. Above.
Supersti'tion, 185, 305, 305, *a*.
Supra-decom'pound. More than decompound; many times subdivided.
Supe'rior. A calyx or corolla is superior when it proceeds from the upper part of the ovary.
Supi'nus. Face upward. See *Resupinate.*
Su'ture, 87.
Sylves'tris. Growing in woods.
Symmet'rical arrangement of leaves, 40.
Sym'metry of floral organs, 241.
——— of structure, 168.
Syn'carpe. (From *sun*, with, and *karpos*, fruit.) A union of fruits.
Syngene'sia, 257–260.
Syn'onyms. Synonymous, different names for the same plant.
Synop'sis. A condensed view of a subject or science.
Synop'sis of the organs of plants, 112.
——— of Mirbel's orders and genera of fruits, 82.
——— of Tournefort's method, 147.
——— of Jussieu's method, 153.
Systemat'ic Botany, 10.
——— ———, its divisions, 11.

Tal'ipot-tree, 57.
Tam'arind, 254.
Tax'æ,
Taxon'omy. (From *taxis*, order, and *nomos*, law.) Method of classification.
Tea, 231.
Teeth of Mosses. The outer fringe of the peristomium is generally in 4, 8, 16, 32, or 64 divisions; these are called teeth.
Te'gens. Covering.
Teg'ument. The skin or covering of seeds; often burst off on boiling, as in the pea.
Tem'perature. The degree of heat and cold to which any place is subject.
Ten'dril, 64, *b*.
Tenel'lus. Tender, fragile.
Tenuifo'lius. Slender-leaved.
Ten'uis. Thin and slender.
Terete'. Round, cylindrical, tapering.
Ter'minal. Extreme, situated at the end.
Ter'nate, 55.
TERNSTROMIA'CEÆ, 423.
Tetradyn'amous. With four long and two short stamens.
Tetran'drous. Having four stamens.
Teu'crium, 237.
Thal'amus, 66.
Thal'lus, Fig. 219.
Thal'lophytes, 391, 399.
The'cæ, 284, 285.
Theophras'ta, Pl. 5, Fig. 4.
Theophras'tus, 332.
The'ory of the metamorphosis of organs, 104, 109, 111.
Thorn, 64, *c*.
Three kingdoms of nature, 375.
THYMELA'CEÆ, 508.
Thyrse, 84.
Tige. See *Caulis.*
Tigel'le, Fig. 117.
TILIA'CEÆ, 422.
Tilland'sia, 39.
Tincto'rious. Plants containing coloring matter.
Tis'sue, 116.
Tobac'co, 185.
Toma'to, 185.
Tomentose'. Downy; covered with fine matted pubescence.
Ton'ic. (From *tono*, to strengthen.) Medicines which increase the tone of the muscular fiber.
Ton'ka bean, 254.
Tooth'ed. See *Dentate.*
Torose'. Uneven, alternately elevated and depressed.
Torulose'. Slightly torose.
To'rus, 66, 85.
Tour'nefort, 350.
Tra'cheæ, 118.
Transforma'tion of organs, 69.
Transform'ed organs, 68, *b*; 323, 5th, 6th, 7th.
Transuda'tion, 120.
Transverse'. Crosswise.
Tree-fern, Fig. 216.
Trees, 280, 285.
Trichot'omous. Three-forked.
Tricom'pound, 55.
Trien'talis, 202.
Tri'fid. Three-cleft.
Trifo'liate. Three-leaved.
TRILLIA'CEÆ, 550.
Trilo'bate. Three-lobed.
Triloc'ular. Three-celled.
Triter'nate, 55.
TROPÆOLA'CEÆ, 428.
Trump'et-flower, 238.
——— honeysuckle, 187.
Trun'cate. Having a square termination, as if cut off.
Trunk. The stem or bole of a tree.
Tube. The lower hollow cylinder of a monopetalous corolla.
Tu'ber, 35, *a*; 43.
Tu'berous. Thick and fleshy, containing tubers, as the potato.
Tu'berous stem, 31, *b*.
Tuberif'erous root, 35, *a*.
Tu'bular, 54, *t*.
——— appendages, 54, *t*.
Tu'lip, 196, *b*; 197.
——— tree, 233.
Tu'nicate. Coated with surrounding layers, as in the onion.
Tu'nicated bulb, 37.
Tur'binate. Shaped like a top, or pear.
Tur'gid. Swelled, inflated.
Tu'rious, 36.
Tur'meric, 165.
Twin'ing. Ascending spirally.
Twist'ed. Coiled.
Ty'pha, 275.
TYPHA'CEÆ, 533.

Uligino'sus. Growing in damp places.
ULMA'CEÆ.
Um'bel. Fig. 93, *b*.
Umbellif'erous. Bearing umbels.
——— plants, 190.
Umbil'icate. Marked with a central depression.

Unarm'ed. Without thorns or prickles.
Un'cinate. Hooked.
Unctuo'sus. Greasy, oily.
Un'dulate. Waving, serpentine, gently rising and falling, Fig. 51, *c.*
Un'guis. A claw.
Unguic'ulate. Inserted by a claw.
U'nicus. Single.
Uniflo'rus. One-flowered.
Unilat'eral. Growing on one side.
Unlin'ing, 77, 77, *a.*
Ur'ceolate. Swelling in the middle, and contracted at the top in the form of a pitcher.
Use of the Corolla, 74, *a.*
—— of insects in the vegetable economy, 75, *a.*
—— of the calyx, 68, *d.*
U'tricle. A little bladder, 90.
Uvula'riæ, 553.

Vaccin'iæ, 475.
Vanil'la, or air-plant, Pl. 4, Fig. 3.
Vale'rian, 165.
VALERIANA'CEÆ, 467.
Valisne'ria, spiralis, 84, *a* ; Pl. 8, Fig. 1.
Valves, 87, *b.*
Vari'eties, 322.
Vas'cular system, 60.
——— fiber, 118.
——— tissue, 53.
Vault'ed. Arched ; with a concave covering.
Veg'etable anatomy, 10.
——— camel, 39.
——— physiology, 114, *c.*
——— constituents, 140.
——— structure analogous to animal, 137.
——— acids, 140, *c.*
Vegeta'tion near the Arctic Ocean, 318.
——— on the mountains of the torrid zone, 321.
Veins, 53.
Vein'lets, 53.
Vena'tion of leaves, 53.
Ven'tral suture, 80, Fig. 98.
Ven'tricose. Swelled out. See *Inflated.*
Ve'nus' fly-trap, 219, Pl. 3, Fig. 6.
VERBENA'CEÆ, 488.
Ver'mifuge. A medicine for the cure of worms.
Ver'nal. Appearing in the spring.
Verna'tion, 51.
Veron'icæ, 168, *a.*
Ver'rucose. Warty, covered with little protuberances.
Ver'satile, 79, *a.*
Ver'tical. Perpendicular.
Verticillas'ter, 84.
Verticil'late. Whorled, having leaves or flowers in a circle round the stem.
Ver'ticils, 66.
Vesic'ular. Made up of cellular substance.
Ves'pertine. Flowers opening in the evening.
Ves'sels, annular, 118
Vexil'lum. See *Banner.*
Victo'ria regina, 231.
Vil'lose. Hairy, the hairs long and soft.
Vil'lus. Soft hairs.
VIOLA'CEÆ, 413.
Viola'ceous. Violet-colored.
Vi'olet, 188.
Vires'cens. Inclining to green.
Vir'gate. Long and slender; wand-like.
Virgul'tum. A small twig.
Viri'dis. Green.
Virose'. Nauseous to the smell, poisonous.
Vis'cid. Thick, glutinous, covered with adhesive moisture.
VITA'CEÆ, 442.
Vitel'lus, 99.
Vit'reous. Glassy.
Vivip'arous. Producing others by means of bulbs or seeds, germinating while yet on the old plant.
Vol'atile oils, 140.
Vol'va, 68, *c* ; 290.
Vul'nerary. (From *vulnus*, a wound.) Medicines which heal wounds.

Wa'ter cow-bane, 190.
Wax, 140, *c.*
Wedge-form. Shaped like a wedge, rounded at the large end, obovate, with straightish sides
Wheel-form, 72.
Wheel-shaped. See *Rotate.*
White pond'-lily, 231.
Whorl'ed, Fig. 91.
Whorls, 66. 84.
——— of flowers, 108.
——— of leaves, 40.
Wild in'digo, 216, Fig. 185.
—— *plants should be studied*, 214, *a.*
—— turnip, 278.
Wil'low, 282.
——— herb, 207.
Wings. The two side petals of a papilionaceous flower.
Wings, 73.
Win'tergreen, 219.
Witch'-hazel, 181.
Wood. The most solid parts of trunks of trees and shrubs.
Wood, 128.
Wood'-sorrel, 222.

Xylos'teum, 300.

Zalu'sian, 343.
Zanthori'za, 194.
ZANTHOXYLA'CEÆ, 434.
ZINGIBERA'CEÆ, 541.
Zool'ogy. The science of animals.
Zo'ophytes, 377.
ZYGOPHYLLA'CEÆ, 432.

SECTION VI.

SYMBOLICAL LANGUAGE OF FLOWERS

Besides the scientific relations which are to be observed in plants, flowers may also be regarded as emblematical of the affections of the heart and qualities of the intellect. In all ages of the world, history and fable have attached to flowers particular associations. We give a few examples;—the lovers of flowers can compile their own dictionaries of sentiments.

Acacia. Friendship.
Acanthus. Indissoluble ties.
Aconitum. (*Monk's-hood.*) Deceit. Poisonous words.
Adonis autumnalis. Sorrowful remembrances.
Agrostemma. (*Cockle.*) Affectation.
Althea. I would not act contrary to reason.
Aloe. Religious superstition.
Amaranthus. Immortality. Unchangeable.
A. melancholicus. Love lies bleeding.
Amaryllis. Splendid beauty. Coquetry.
Anemone. Frailty.
Apocynum. Falsehood.
Arbor Vitæ. (*Thuja occidentalis.*) Unchanging.
Arum. Deceit. Treachery.
Asclepias. (*Milk-weed.*) Cure for the heartache.
Aster. Beauty in retirement.
Auricula. Elegance.

Bachelor's button. Hope in misery.
Balm. Sweets of social intercourse.
Balsam. (*Impatiens.*) Do not approach me.
Bay. (*Laurus.*) I change but with death.
Box. Constancy.
Broom. Humility.
Broom-corn. Industry.

Calla ethiopica. (*Egyptian lily.*) Feminine delicacy.
Camellia Japonica. (*Japan rose.*) Admiration.
Campanula. (*Bell-flower.*) Gratitude.
Cape Jasmine. (*Gardenia florida.*) My heart is joyful.
Cardinal flower. (*Lobelia cardinalis.*) High station does not secure happiness.
Carnation. (*Dianthus.*) Disdain. Pride.
Catch-fly. (*Lychnis.*) I am a willing prisoner.
Cedar. (*Juniperus.*) You are entitled to my love.
Chamomile. Cheerfulness in adversity.
China-aster, double. (*Aster chinensis.*) Your sentiments meet with a return.
China-aster, single. You have no cause for discouragement.
Chrysanthemum, red. Love.
Chrysanthemum, white. Truth needs no protestations.
Chyrsanthemum, yellow. A heart left to desolation.
Citron. Beautiful, but ill-humored.
Clematis. (*Virgin's-bower.*) Mental excellence.
Cock's-comb. (*Amaranthus.*) Foppery. Misplaced finery.
Columbine, purple. (*Aquilegia canadensis.*) I cannot give thee up.
Columbine, red. Hope and fear alternately prevail.
Convolvulus. Uncertainty.
Cornus. Indifference. A changed heart.
Cowslip. (*Primula.*) Native grace.
Crocus. Cheerfulness.
Crown-imperial. (*Fritillaria imperialis.*) Power without benevolence.
Cypress. Disappointed hopes. Despair.

Dahlia. Forever thine.
Daisy. (*Bellis perennis.*) Unconscious beauty
Dandelion. Smiling on all. Coquetry.

Eglantine. (*Rosa rubiginosa.*) I wound to heal
Elder. (*Sambucus.*) Compassion yielding to love.
Everlasting. (*Gnaphalium.*) Never-ceasing remembrance.

Fox-glove. (*Digitalis.*) I am not ambitious for myself, but for you.
Fuschsia. (*Ladies' ear-drop.*) It were all one, that I should love a bright particular star, and think to wed it.

Geranium, fish. Thou art changed.
Geranium, oak. Give me one look to cheer my absence.
Geranium, rose. Many are lovely, but you exceed all.

Hawthorn. (*Cratægus.*) "Hope! I thee invoke!"
Heart's-ease. (*Viola tricolor.*) Forget-me-not.
Hibiscus. Beauty is vain.
Holly. (*Ilex.*) Think upon your vows.
Hollyhock. (*Althea rosea.*) Ambition.
Honeysuckle. (*Lonicera.*) Fidelity.
Houstonia cerulea. Meek and quiet happiness Innocence.
Hyacinth. Love is full of jealousy.
Hydrangea. Assuming.
Hypericum. (*St. John's-wort.*) Animosity.

Ipomæa. Busybodies are a dangerous sort of people.
Iris. I have a message for you.
Iva. (*Vitis hedera.*) Female affection. I have found one true heart.

Jasmine. You bear a gentle mind. Amiability.
Jonquil. (*Narcissus.*) Affection returned.

Laburnum. (*Cytisus laburnum.*) Pensive beauty.
Ladies'-slipper. (*Cypripedium.*) Capricious beauty.
Larkspur. (*Delphinium.*) Inconstancy.
Laurel. (*Kalmia.*) Oh what a goodly outside falsehood hath!
Lavender. Words, though sweet, may be deceptive.

Lemon. (*Citrus lemonium.*) Discretion.
Lilac. (*Syringa.*) First love.
Lily, white. (*Lilium candidum.*) Purity. With looks too pure for earth.
Lily, yellow. False, light as air.
Lily of the valley. (*Convallaria.*) Delicacy. The heart withering in secret.
Locust, the green leaves. Affection beyond the grave. Sorrow ends not when it seemeth done!
Lupine. Indignation.

Magnolia. Perseverance.
Marigold. Cruelty. Contempt.
Mirabilis. (*Four-o'clock.*) Timidity.
Mignonette. (*Reseda odorata.*) Moral and intellectual beauty.
Mimosa. (*Sensitive plant.*) My heart is a broken lute!
Mock orange, or *Syringa.* (*Philadelphus.*) Counterfeit. I cannot believe one who has once deceived me.
Myrtle. (*Myrtus.*) Love.
Myrtle, withered. Love betrayed.

Narcissus. Egotism. The selfish heart deserves the pain it feels.
Nasturtion. (*Tropæolum.*) Honor to the brave. Wit.
Nettle. (*Urtica.*) Scandal.
Nightshade. Suspicion. Artifice. Skepticism.

Oleander. Beware. Shun the coming evil.
Olive. Peace. After a storm comes a calm.
Orange flowers. Bridal festivity.

Parsley. (*Apium.*) Useful knowledge.
Passion-flower. (*Passiflora.*) Devotion.
Peach blossom. Here I fix my choice.
Periwinkle. (*Vinca.*) Recollection of the past.
Phlox. Our souls are united.
Pine. (*Pinus resinosa.*) Time and philosophy.
Pine, spruce. Farewell.
Pink, single white. (*Dianthus.*) Ingenuousness. Stranger to art.
Pink, single red. A token of all the heart can keep of holy love, in its fountain deep.
Pink, China. (*Dianthus chinensis.*) Perseverance. Though repulsed, not in despair.
Pink, variegated. Refusal. You have my friendship, ask not for more.
Pæony. (*Pæonia.*) Ostentation.
Polyanthus. Confidence.
Pomegranate flower. (*Punica.*) Mature and beautiful.
Poppy, red. Consolation. Let the darkness of the past be forgotten in the light of hope.
Poppy, white. Doomed to heal, or doomed to kill—fraught with good, or fraught with ill.
Poppy, variegated. Beauty without loveliness.
Primrose. (*Primula.*) Encouragement to modest worth.
Primrose, evening. (*Œnothera.*) Inconstancy. Man's love is like the changing moon.

Ranunculus. Thou art fair to look upon, but not worthy of affection.
Rosemary. Keep this for my sake: I'll remember thee.
Rose-bud. Confession. Thou hast stolen my affections.
Rose, Burgundy. Modesty and innocence united to beauty.
Rose, damask. Sweeter than the opening rose.
Rose, red. The blush of modesty.
Rose, moss. Superior merit.
Rose, white. In maiden meditation, fancy free.
Rose, white, withered. Emblem of my heart Withered like your love.
Rose, wild. Simplicity. Let not your unsophisticated heart be corrupted by intercourse with the world.
Rose, cinnamon. Without pretension. Such as I am, receive me; would I were of more worth for *your sake.*
Rue. (*Ruta.*) This trifling may be mirth to you, but 'tis death to me.

Sage. (*Salvia.*) Domestic virtues. Woman's province is *home.*
Scarlet lychnis. (*Lychnis chalcedonica.*) I see my danger without power to shun.
Snapdragon. (*Antirrhinum.*) I have been flattered with false hopes.
Snow-ball. (*Viburnum.*) Virtues cluster around thee. A *union.*
Snow-drop. (*Galanthus.*) Though chilled with adversity, I will be true to thee. I am not a summer friend.
Solidago. (*Golden rod.*) Encouragement.
Sorrel. (*Rumex.*) Wit ill-timed. He makes a foe who makes a jest.
Speedwell. (*Veronica.*) True love's a holy flame, and when 'tis kindled, ne'er can die.
Spider-wort. (*Tradescantia.*) The pledge of *friendship.* 'tis all my heart can give. Wouldst thou then counsel me to fall in love?
Star of Bethlehem. (*Ornithogalum.*) Reconciliation. Light is brightest when it shines in darkness.
Stock July-flower. You are too lavish of your smiles.
Strawberry. (*Fragaria.*) A pledge of future happiness.
Sumach. (*Rhus.*) Splendid misery.
Sun-flower. (*Helianthus.*) You are too aspiring.
Sweet-pea. Departure. Must you go?
Sweet-william. (*Dianthus barbatus.*) Finesse. One may smile and be a villain.

Thistle. (*Carduus.*) Misanthropy. O that the desert were my dwelling-place!
Thorn-apple. (*Stramonium.*) Alas! that falsehood should appear in such a lovely form.
Thyme. Less lovely than some, but more estimable.
Tuberose. (*Polyanthus tuberosa.*) Blessings brighten as they take their flight.
Tulip. Vanity. Thou hast metamorphosed me! This love has been like a blight upon my opening prospects.
Tulip-tree. (*Liriodendrum.*) Rural life favorable to health and virtue.

Verbena. Sensibility. The heart that is soonest awake to the flowers, is always the first to be touched by the thorns.
Violet, blue. Faithfulness. I shall never forget.
Violet, white. Modest virtue.

Wall-flower. (*Cheiranthus.*) Misfortune is a blessing when it proves the truth of friendship.
Water-lily. (*Nymphæa.*) The American lotus An emblem of silence.
Weeping-willow. (*Salix.*) Bereaved. Ask not one to join in mirth whose heart is desolate.
Wood-sorrel. (*Oxalis.*) Tenderness and affection.
Woodbine. (*Lonicera.*) Fraternal love.

Yarrow. (*Achillea.*) To heal a wounded heart

INDEX

TO THE

BOTANICAL NAMES OF PLANTS,

BY THEIR COMMON NAMES.

In the following Index, either the whole name of the Genus, or one or two of its first syllables, are annexed to the common name. By a reference to the alphabetical arrangement of genera, the Species of the plant with the Artificial Order and Class are ascertained.

Acacia. Robi-
Adam's needle. Yuc-
Adder-tongue. Erythro-
Adder-tongue fern. Ophi-
Agrimons. Agri-
Albany beech-drops. Pte-
Alder. Alnus.
Alum-root. Heuch-
American laurel. Kal-
American cowslip. Cal-
American oil-nut. Ham-
American water-cress. Carda-
American Papaw-tree. Asi-
Anemone. Anem-
Angelica. Angel-
Anise-tree. Illi-
Apple. Pyrus.
Apricot. Armeni-
Arbor vitæ. Thuja.
Arrow-grass. Triglo-
Artichoke. Cyna- Helian-
Arrow-head. Sagit-
Ash. Fraxi-
Asparagus. Aspar-
Asphodel. Aspho-
Atamasko-lily. Amaryl-
Avens. Geum-

Bachelor's-button. Gom
Balm. Melis-
Balsamine. Impa-
Balsam-apple. Momor-
Balm of Gilead. Popu- Amyr-
Barley. Horde-
Barberry. Berber-
Bass-wood. Tilia.
Bay-berry. Myrica
Beard-grass. Androp-
Beard-tongue. Pentste-
Bean. Phase-
Bear-berry. Arbu-
Bed straw. Galium.
Beech. Fagus.
Beech-drops. Epiphe-
Beet. Beta.
Bell-wort. Uvula-
Bell-flower. Campan-
Billberry. Vac-
Birch. Betula.
Bitter-vetch. Orobus.
Bird's-nest. Monotropa.
Bird-wort. Aristo-
Bind-weed. Convol-
Blackberry. Rubus-
Blackberry-lily. Ixia.
Black-flower. Mela-
Black-hoarhound Ballo-
Black-walnut. Juglans.
Bladder-campion. Cucubalus.
Bladder-nut. Staph-
Bladder-senna. Colut-
Bladder-wort. Utricu-
Blazing-star. Helo-
Blessed-thistle. Centau-
Blind-starwort. Mie-
Blite. Blitum.
Blood-marigold. Zinnia.
Blood-root. Sanguin-
Blue-bell. Campan-
Blue-curls. Tricnos-
Blue hearts. Buchne-
Blue-eyed grass. Sisy-
Blue-bottle. Centau-
Blue-gentian. Isan-
Bog-rush. Kyl-
Boneset. Eupa-
Borage. Bora-
Bouncing-bet. Sapo-
Box. Boxus.
Box-wood. Cornus.
Brake. Pteris.
Bread-grass. Ares-
Bristled-panic. Pen-
Broom-corn. Sorgh-
Buck-eye. Æsc.
Buckwheat. Polygo-
Buck-bean. Menyan-
Buckthorn. Rhamnus.
Bugloss. Anchu-
Bulrush. Juncus.
Burnet. Poteri-
Burdock. Arcti-
Burnet-Saxifrage. Sanguisor-
Burr-reed. Sparga-
Bush-clover. Hedys- Lespe-
Bush-honeysuckle. Dierv-
Butternut. Juglans.
Butterfly-weed. Vexil-
Butter-wort. Pinguic-
Button-bush. Cephal-
Button-wood. Plata-

Cabbage. Bras-
Cahlops. Trib-
Campion. Lych-
Cancer-root. Epiph-
Cane. Mie-
Canna. Canna.
Caraway. Carum.
Cardinal-flower. Lobel-
Carolina allspice. Calycan-
Carpet-weed. Mollug.
Carrot. Daucus.
Castor-oil plant. Rici-
Catalpa. Catal-
Catch-fly. Silene.
Catnep. Nepeta.
Cat-tail. Typha.
Caterpillar-fern. Scol-
Celery. Apium.
Centaury. Sabba-
Chamomile. Aneth-
Chara. Cha-
Cherry. Prunus. Ceras-
Chestnut. Casta-
Chess. Broom-grass. Bro-
Chick-wintergreen. Trien.
Chick-pea. Cicer.
Choke-berry. Aronia.
Cinque-foil. Poten-
Cives. Allium.
Clarkia. Clar-
Clover. Trifo-
Club-rush. Seir-
Cockle. Agros-
Cock-foot grass. Panicum.
Cockscomb. Amar-
Coffee-bean. Gymno-
Cohosh. Macro-
Colic-weed. Cory-
Colt's-foot. Tussil-
Columbine. Aqui.
Comb-tooth thistle. Cardu-
Comfrey. Symph-
Cone-flower. Rud-
Coral-tree. Erythrythrina.
Coral-root. Coral-
Coreopsis. Coreop-
Coriander. Corian-
Coronilla. Coro-
Cotton-thistle. Onop-
Cotton. Gossyp-
Cow-parsley. Herac-
Cow-wheat. Melampy-
Cowhage. Doli-
Cranberry. Oxyc-
Creeping-cucumber. Meloth
Creeping-vetch. Ervum.
Crowberry. Empe-
Crown-beard. Verbes-
Crown-imperial. Friti-
Crow-foot. Ranun-
Cucumber. Cucum-
Culver's-physic. Leptan-
Currant. Ribes.
Currant-leaf. Mitel-
Cut-grass. Leer-
Cypress-vine. Ipo-

Daffodil. Narci-
Date-plum. Diosp-

Dandelion. Leon-
Darnel-grass. Loli-
Day-flower. Comme-
Day-lily. Hemero-
Dead-nettle. Lami-
Deadly nightshade. Atrop-
Deer-grass. Rhex-
Dew-berry. Rubus.
Dill. Aneth-
Ditch-moss. Udo-
Dittany. Cuni-
Dock. Rumex.
Dodder. Cuscu-
Dog-tooth violet. Erythro-
Dog-bane. Apoc-
Dog-wood. Cornus.
Dragon-head. Dracoceph-
Dry-strawberry. Dali-
Duck's-meat. Lemna.
Dwarf-dandelion. Krig-
Dyer's-broom. Genis-

Ear-drop. Fuschsia.
Elder. Sambu.
Elecampane. Inu-
Elephant's-foot. Eleph-
Elm. Ulmus.
Enchanter's nightshade. Cir-
Endive. Cicho-
English cowslip. Primu-
English primrose. Primu-
English water-cress. Erysim-
European ivy. Hedera.
Evening primrose. Œnoth.
Eye-bright. Euphr-

False papaw-tree. Cari-
False rush-grass. Leer-
False bog-rush. Pehyr-
False saffron. Cartha-
False spiked-alder. Elliot-
False syringa. Philad-
False toad-flax. Thesi-
False wake-robin. Trill-
Fan-palm. Chamæ-
Feather-leaf. Hydro-
Feather-grass. Sti-
Fennel. Aneth-
Fescue-grass. Festu-
Fenu-greek. Trig-
Fever-few. Chrysan-
Fever-root. Trios-
Field-sorrel. Rumex.
Field-thyme. Clini-
Fig-tree. Ficus.
Fire-weed. Sene-
Flag. Iris.
Flax. Linum.
Flower-de-luce. Iris.
Flowering almond. Amyg-
Flowering arum. Oron-
Flowering ash. Ornus.
Flowering fern. Osmun-
Flowering nettle. Galeop-
Flowering raspberry. Rubus.
Fork-fern. Heros-
Fool's-parsley. Areth-
Four-o'clock. Mirab-
Fringe-tree. Chion-
Fringe-tree, purple. Rhus
Frost-plant. Cistus.
Fumitory. Fuma-

Garden artichoke. Cynara.
Garden daisy. Chrysan-
Garden ladies'-slipper. Impa-
Gayfeather. Liatris.
Gentian. Gentia-
Geranium. Pelarg-
Gill-over-ground. Glech-
Ginseng. Panax.
Globe-flower. Troll-
Globe-thistle. Echi-
Goat's-rue. Gale-
Gold-basket. Alyss-
Gold-of-pleasure. Alyss-
Gold-thread. Coptis.
Golden-rod. Solid-
Golden-saxifrage. Chrys-
Gooseberry. Ribes.
Gourd. Cucur-
Grape-fern. Botrych-
Grape-vine. Vitis.
Grass-pink. Cymbid-
Grass-wrack. Zos-
Greek valerian. Polemo-
Green-brier. Smilax.
Gromwell. Lithos-
Ground-ivy. Glech-
Ground-nut. Api-
Ground-pine. Lycopo-
Groundsel-tree. Baccha-

Hardhack. Spirea.
Hawk-weed. Hiera-
Hawthorn. Cratægus.
Hazel-nut. Corylus.
Heath. Eri-
Hedge-hyssop. Grati-
Hedge-mustard. Sisym-
Hedge-nettle. Stach-
Hellebore. Helleb-
Hemp. Cannab-
Henbane. Hyoscy-
Hickory. Carya.
High cranberry. Vibur-
High healall. Pedic-
High-water shrub. Iva.
Hog-weed. Ambro-
Hoarhound. Marr-
Hollyhock. Alth-
Honey-locust. Gledit-
Hop. Humu-
Horn-beam. Ostr-
Horn-wort. Cera-
Horned poppy. Arge-
Horse-chestnut. Æscu-
Horse-radish. Coch.
Horse-balm. Collinson-
Hound-tongue. Cynog-
House-leek. Semper-
Hydrangea. Hydran-

Ice-plant. Mesem-
Indian corn. Zea.
Indian cucumber. Mede-
Indian mallows. Sida.
Indian physic. Gille-
Indian reed. Canna.
Indigo. Indi-
Innocence. Hous-
Iron-wood. Ostr-

Jasmine. Jas-
Jerusalem artichoke. Helian-
Jewel-weed. Impa-
Job's-tear. Coix.
Jonquil. Narcis-
Judas'-tree. Cercis-
Juniper-berry. Juni-

Knawell. Scleran-
Knot-grass. Polyg-

Labrador tea. Ledum.
Ladies'-mantle. Alche-
Ladies'-tresses. Neot-
Ladies'-slipper. Cypri-
Lady-in-the-green. Nigel
Lamb-lettuce. Fe-
Larkspur. Delph-
Lavender. Lavan-
Lavatera. Lava-
Leaf-flower. Phyll
Leather-leaf. Androm
Leather-wood. Dir-
Leek. Allium.
Lemon. Citrus.
Leopard's-bane. Arni-
Lettuce. Lact-
Lichnidia. Phlox.
Lilac. Syr-
Lily-of-the-valley. Con
Lily. Lilium.
Limodore. Tipu.
Liquorice. Glycyrr-
Live-forever. Sedum
Liver-leaf. Hepat-
Lizard-tail. Sauru-
Locust-tree. Robin-
Loose-strife. Lysim-
Lop-seed. Phry-
Lucerne clover. Medic-
Lung-wort. Pulmo-

Madder. Rub-
Magnolia. Magn-
Maiden-hair. Adian-
Malabar-nut. Justi-
Mangrove. Rhizo-
Maple. Acer.
Marjoram. Ori-
Marsh penny-wort. Hydroc-
Marsh rosemary. Stati-
Marigold. Tagetes. Calen-
Matrimony-vine. Lycium
Mat-grass. Nar-
Mayweed. Anthe-
Meadow-rue. Thal-
Medlar. Mespi-
Meliot-clover. Meli.
Mermaid-weed. Pros.
Melic-grass. Meli-
Mezereon. Daphne.
Mignonette. Rese-
Milk-weed. Ascle-
Milk-willow herb. Lytn-
Milk-vine. Periplo-
Milk-vetch. Astrag-
Mint. Mentha.
Mistletoe. Viscum.
Mitre-wort. Tiar-
Mock-orange. Philad
Monkey-flower. Mimu-
Monk's-hood. Aconi-
Moon-seed. Menis-
Moor-grass. Sesle-
Morning-glory. Ipo-
Motherwort. Leonu-
Mountain-ash. Sorbus.
Mountain-daisy. Bellis.
Mountain-flax. Polyg-
Mountain-mint. Pycnan
Mountain-rice. Ory-
Mouse-ear. Ceras-
Mud-purslane. Portu-
Mulberry. Morus.
Mullein. Verbas-
Mullein, pink. Agrostem
Muskmelon. Cucumis.
Muskmallows. Hibis-
Mushroom. Agaricus.
Myrtle. Myrtus.

Nasturtion. Trop-
Necklace-weed. Acta-
Nettle. Urt-

Nettle-tree. Celtis.
Night-shade. Solan-

Oak. Quercus.
Oak of Jerusalem. Cheno-
Oat. Avena.
Oil-nut. Hamil-
Oily grain. Sesam-
Old man's beard. Tilland-
Olive. Olea.
Onion. Allium-
Orach. Atrip-
Orange. Citrus.
Orange-root. Hydras-
Orchard-grass. Dact-
Orchis. Orch-
Ox-eyed daisy. Chrysan.

Painted-cup. Bart-
Paper-mulberry. Brous-
Papoose-root. Leontice. Cl. 6. Or. 1.
Parnassus-grass. Parnas-
Parsley. Api-
Parsnip. Pasti-
Partridge-berry. Mitch-
Passion-flower. Passi-
Pea-nut. Arachis. Cl. 16. Or. 10.
Pea. Pisum.
Peach. Amyg-
Pear. Pyrus.
Pearl-wort. Sagina.
Pellitory. Parieta.
Penny-royal. Hede-
Penny-wort. Obo-
Peony. Pæo-
Pepper. Piper.
Pepper-grass. Lepid-
Peppermint. Menth-
Peperidge-tree. Nyssa.
Periwinkle. Vinca.
Persimmon. Diospy-
Pheasant-eye. Adonis.
Physic-nut. Jatro-
Pickerel-weed. Ponted-
Pig-weed. Cheno-
Pine. Pinus.
Pink. Dian-
Pink-root. Spig-
Pipe-wort. Eri-
Pipsissiwa. Chimaph-
Plantain. Plant-
Plum. Prunus.
Poke-weed. Phyto-
Poison-hemlock. Cicu.
Poison-ivy. Rhus.
Polyanthos. Narc-
Polypod. Polypo-
Pomegranate. Punica.
Pond-weed. Potam-
Poplar. Popu-
Poppy. Papav-
Potato. Sola-
Pot-marigold. Calen-
Prim. Ligustrum.
Prickly-ash. Xanthor
Prickly-pear. Cactus.
Pride of China. Melia
Prince's pine. Chimaph-
Puccon. Batsch-
Pumpkin. Cucur-
Purslane. Portu-

Quake-grass. Briza.
Queen-of-the-meadow Spir-
Quince. Pyrus.

Radish. Raph-
Raspberry. Rubus.

Rattle-box. Croto-
Red-cedar. Juni-
Red-pepper. Caps-
Red-top grass. Agros-
Red-root. Dila-
Reed. Arum.
Riband-grass. Phal-
Rice. Oryza.
River-nymph. Caulinia.
Rocket. Hesp-
Rock-rose. Cistus.
Rose. Rosa.
Rose-bay. Rhododen-
Rose-campion. Agrostem-
Rose-locust. Robin-
Rosemary. Rosni-
Rue. Ruta.
Ruel. Ruellia.
Rush-grass. Juncas.
Rye. Secale.

Sacred bean. Nelum-
Saffron of Europe. Crocus
Sage. Salvia.
Salt-wort. Sals-
Salt-grass. Lim-
Salsify. Tragop-
Samphire. Sali-
Sanicle. Sanic-
Sand-wort. Arenaria.
Sand-myrtle. Leioph-
Sarsaparilla. Aralia.
Sassafras. Laurus.
Satin-flower. Luna-
Savin. Juni-
Savory. Satureja.
Saxifrage. Saxif-
Scabish. Œnoth-
Scarlet pimpernel. Anagal-
Scorpion-grass. Myoso-
Scouring-rush. Equise-
Scrofula-weed. Goodye-
Scull-cap. Scu-
Sea-buckthorn. Hippo-
Sea-burdock. Xan-
Sea-holly. Eryng-
Sea-kale. Brassica.
Seasame-grass. Trip-
Self-heal. Prun-
Sensitive-fern. Onoc-
Shad-flower. Aronia.
Shell-flower. Molu-
Shepherd's-purse. Thlaspi.
Shield-fern. Aspid-
Shin-leaf. Pyro-
Side-saddle flower. Sarra-
Silk-weed. Ascle-
Single-seed cucumber. Sicyos.
Skunk's cabbage. Ictodes.
Sleek-leaf. Leioph-
Smellage. Ligusticum.
Snake-head. Chelone.
Snake-mouth. Pogo-
Snap-dragon. Antirr-
Snow-ball. Vibur.
Snow-berry. Sympho-
Snow-drop tree. Halesia.
Soap-wort. Sapin- Sapo-
Solomon's-seal. Conval-
Southern-wood. Arte-
Spanish-broom. Sparti-
Speedwell. Veron-
Spear-grass. Poa.
Spear-arum. Rens-
Spearmint. Mentha.
Spicy wintergreen. Gaultheria.
Spice-bush. Laureus.
Spider-wort. Trades-
Spikenard. Aralia.

Spindle-tree. Euon
Spinage. Spina-
Spleen-wort. Asple-
Spring-beauty. Clay-
Spruce. Pinus.
Spurge. Euphor-
Spurry. Sper-
Squash. Cucur-
Squills. Scilla.
Star-of-Bethlehem. Ornith-
Star-flower. Aster.
Star-grass. Hyp-
Star-wort. Stel-
Stock July-flower. Cheir-
Stone-crop. Sedum.
Stork's-bill geranium. Erod
St. John's-wort. Hyper-
St. Peter's-wort. Ascy
Stramonium. Datu-
Strawberry. Fraga
Succory. Cicho-
Sugar-cane. Saccha-
Sulphur-wort. Peuceda-
Sumach. Rhus.
Sun-flower. Helian-
Swamp-willow herb. Deco-
Sweet-basil. Ocy-
Sweet-brier. Rosa.
Sweet-cicely. Uras-
Sweet-flag. Acorus.
Sweet-fern. Comp-
Sweet-gum tree. Liquid-
Sweet-pea. Lathy-
Sweet pepper-bush. Cleth-
Sweet vernal-grass. Anthox
Sweet-william. Dianthus.
Swine-thistle. Sonchus.
Syringa. Phil-

Tallow-tree. Stillin-
Tamarind. Tam-
Tansey. Tana-
Tape-grass. Valis-
Tassel-flower. Cacal-
Tea. Thea.
Teasel. Dips-
Thistle. Cnicus.
Thorn-apple. Datu-
Thorn-bush. Crata-
Thoroughwort. Eupa-
Thread-foot. Podos.
Three-bird orchis. Triph-
Three-seed mercury. Acaly-
Thyme. Thymus.
Tiger-flower. Tig-
Timothy grass. Phleum
Tobacco. Nicotia-
Toothache-tree. Zanthox
Tooth-cup. Amman-
Tooth-root. Dent-
Tower-mustard. Turri-
Trailing arbutus. Epig-
Trumpet-flower. Bign
Tuberose. Polyan-
Tulip. Tulipa.
Turnip. Bras-
Tway-blade. Listera.
Twin-flower. Linneæ.

Valerian. Valer-
Vanilla-plant. Epid-
Vegetable oyster. Tragop-
Venus' fly-trap. Dionæa.
Vervain. Verbe-
Vetch. Vicia.
Violet. Viola.
Viper's bugloss. Echi-
Virginian loose-strife. Gaura-
Virginian orpine. Pentho-

Virginian snake-root. Aristo-
Virgin's bower. Clem-

Wall-cress. Arab-
Wall-flower. Cheir-
Walnut. Carya.
Water arum. Calla.
Water crown-cup. Sparg-
Water dropwort. Ornan-
Water hemp. Acni-
Water leaf. Hydro-
Water milfoil. My-
Watermelon. Cucur-
Water parsnip. Sium.
Water shield. Villar-
Water plantain. Alis-
Wax-bush. Cuph-
Wheat. Trit-
Whip-grass. Sele-
White cedar. Cupres- Thu-
White lettuce. Prenan-
White pond-lily. Nymph-
Whitlow grass. Draba.
Whortleberry. Vaccin-
Wild bean. Stropos-
Wild bean-vine. Amphi-
Wild cucumber. Momor-
Wild geranium. Gera-
Wild honeysuckle. Azal-
Wild indigo. Baptis-
Wild ladies'-slipper. Cypri-
Wild lamb-lettuce. Vale-
Wild mandrake. Podoph-
Wild oats. Dantho-
Wild pine. Tilland-
Wild rice. Ziga-
Wild tobacco. Lobel-
Wild turnip. Arum.
Willow. Salix.
Willow-herb. Epil-
Winter cherry. Phys-
Witch-alder. Fother-
Witch-hazel. Hama-
Woad. Isatis.
Wood-sorrel. Oxal-
Woodbine. Loni-

Yam root. Diosc-
Yarrow. Achil-
Yellow-eyed grass. Xyris.
Yellow-root. Zanth-
Yellow-rattle. Rhin-
Yew. Taxus.

INDEX

TO THE

PLANTS REPRESENTED IN THE PLATES.

Abies picea, ... Pl. 7, Fig. 2.
Agaricus cretaceus, ... Pl. 3, Fig. 8.
Agave americana, ... Pl. 6, Fig. 2.
Areca oleracea, ... Pl. 1, Fig. 1.

Boletus silicinus, ... Pl. 3, Fig. 9.
Bromelia ananas, ... Pl. 5, Fig. 3.
Butomus umbellatus, ... Pl. 8, Fig. 4.

Cactus opuntia, ... Pl. 1, Fig. 5.
Cactus peruvianus, ... Pl. 1, Fig. 1.
Cactus melocactus, ... Pl. 1, Fig. 7.
Chamærops humilis, ... Pl. 3, Fig. 3.
Carica papaya, ... Pl. 4, Fig. 1.
Clathrus cancellatus, ... Pl. 4, Fig. 7.
Casuarina, ... Pl. 6, Fig. 1.
Crescentia cujete, ... Pl. 4, Fig. 2.
Cycas circinalis, ... Pl. 7, Fig. 3.
Cymbidium echinocarpon, ... Pl. 2, Fig. 4.
Cyperus papyrus, ... Pl. 6, Fig. 5.

Digitalis purpurea, ... Pl. 7, Fig. 6.
Dionæa muscipula, ... Pl. 3, Fig. 6.
Dodecatheon media, ... Pl. 7, Fig. 9.
Dracæna draco, ... Pl. 1, Fig. 3.

Ferula tingitana, ... Pl. 2, Fig. 2.
Fritillaria imperialis, ... Pl. 7, Fig. 4.
Fucus conglomeratus, ... Pl. 8, Fig. 7.
Fucus articulatus, ... Pl. 8, Fig. 8.
Fucus digitatus, ... Pl. 8, Fig. 9.
Fucus natans, ... Pl. 8, Fig. 10.
Fucus obtusatis, ... Pl. 8, Fig. 11.

Hippuris vulgaris, ... Pl. 6, Fig. 7.

Iris germanica, ... Pl. 6, Fig. 6.

Juncus conglomeratus, ... Pl. 8, Fig. 7

Lycopodium cernuum, ... Pl. 7, Fig. 5
Lycopodium alopecuroides, ... Pl. 7, Fig. 8

Maranta arundinacea, ... Pl. 3, Fig. 4.
Musa paradisiaca, ... Pl. 1, Fig. 4.

Narcissus poeticus, ... Pl. 7, Fig. 7.
Nepenthes distillatoria, ... Pl. 4, Fig. 4.
Nelumbo nucifera, ... Pl. 8, Fig. 6.

Pandanus, ... Pl. 5, Fig. 1.
Panicum italicum, ... Pl. 4, Fig. 6.
Passiflora quandrangularis, ... Pl. 6, Fig. 4.
Phallus impedicus, ... Pl. 3, Fig. 7.
Pinus Pinea, ... Pl. 7, Fig. 1.
Pistia stratiotes, ... Pl. 8, Fig. 2.
Populus fastigiata, ... Pl. 3, Fig. 1.
Potamageton compressum, ... Pl. 8, Fig. 5.

Rhizophora mangle, ... Pl. 5, Fig. 2.

Saccharum officinale, ... Pl. 2, Fig. 2.
Salix babylonica, ... Pl. 3, Fig. 2.
Sarracenia purpurea, ... Pl. 3, Fig. 5.
Sempervivum tectorum, ... Pl. 4, Fig 5.
Stizolobium altissimum, ... Pl. 6, Fig. 3.

Theophrasta americana, ... Pl. 5, Fig. 4.
Trapa natans, ... Pl. 8, Fig. 3.
Typha latifolia, ... Pl. 1, Fig. 6.

Valisneria spiralis, ... Pl. 8, Fig. 1
Vanilla aromatica, ... Pl. 4, Fig. 3

Yucca aloifolia, ... Pl. 2, Fig. 1